The Refrigeration Service Engineer

VOL. 14 NO. 3 ★ ★ ★ MARCH . 1946

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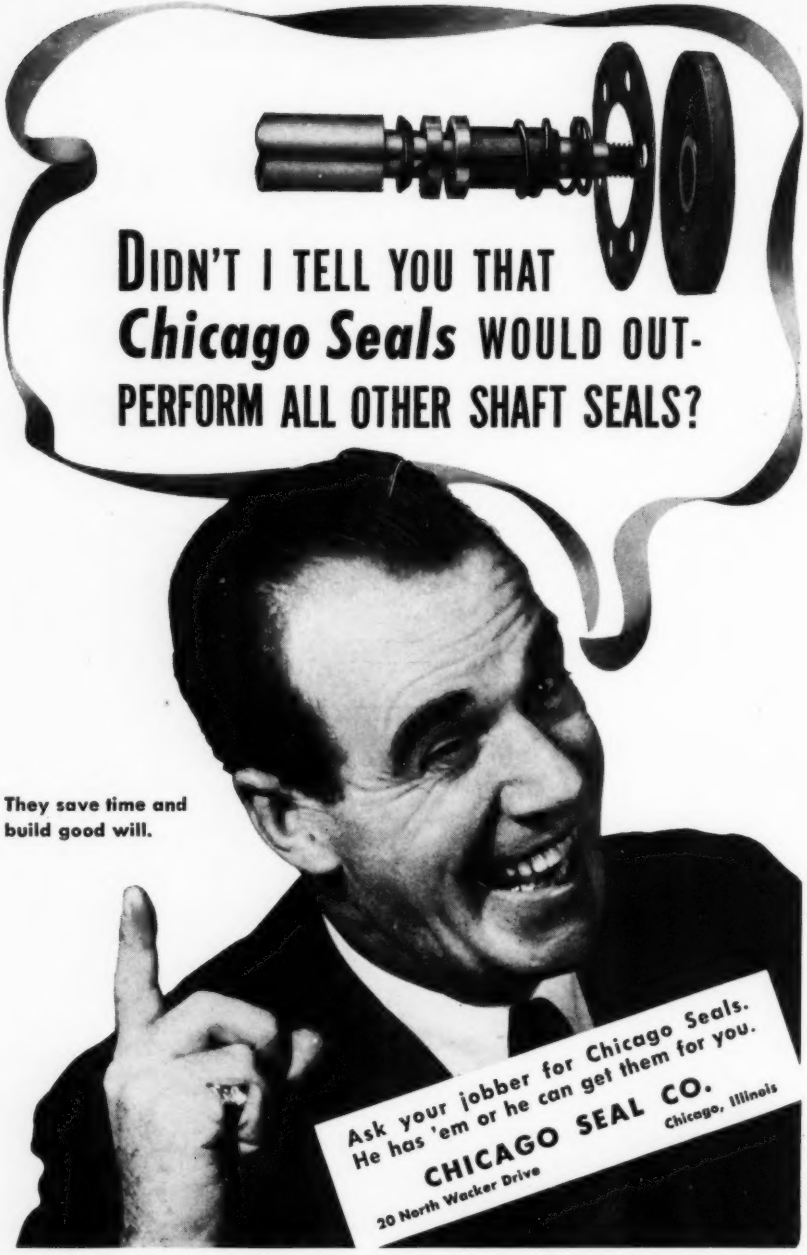
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The Ansul Research Staff
REPORTS ON . . . . . **WAX** causes frozen valves *too!*

HERE'S FURTHER ***Proof*** RESULTS OF MACHINE TESTS

The equipment used consisted of 1/4 hp. motor, reciprocating compressor and dry coil with the thermostatic expansion valve located in contact with the coil.

A filter of steel wool and fine copper screen was placed in the liquid line just ahead of the expansion valve. The liquid line leading to the filter was coiled about the expansion coil to insure feeding cold liquid to the filter. The expansion valve, liquid line, filter and expansion coil were placed in a metal container and insulated with rock wool. A pentane thermometer, attached to the side of the filter, recorded temperatures which were, of course, much lower than corresponding temperatures taken in other parts of the equipment.

After the equipment had operated for four days with the filter at approximately −50 degrees F., the filter was quickly removed, dismantled and photographed while still cold. For example, Photograph A shows a considerable separation of wax. Photograph B shows a portion of this wax after removal from the filter.

A—Wax separated on filter at −50° Fahrenheit.

B—Wax removed from filter at −50° Fahrenheit.

ANSUL JOBBERS are ready and equipped to render an intelligent, co-operative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:

Samples of ice machine oils, submitted by users of Ansul Refrigerants to Ansul Jobbers, are tested by Ansul laboratories without charge by the Ansul Standard Wax-Oil Separation Method. This approved method, developed and standardized especially for use in connection with oils used in refrigerating systems, provides an accurate determination of the amount of wax which separates from an oil at low temperatures. REG. U.S. PAT. OFF.

SEND FOR THIS BULLETIN

An informative reprint, "THE SEPARATION OF WAX FROM OIL-REFRIGERANT MIXTURES," will be sent on request. No obligation. Just address . . . .

REMEDIES

To eliminate the wax trouble in expansion valves and coils:

1. Use an oil which separates little or no wax from its mixture with the refrigerant at the operating temperature of the valve.
2. Install an oil trap to cut down the amount of oil (and consequent wax) circulating with the refrigerant.

ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN
DISTRIBUTORS FOR KINETIC'S "FREON-11," "FREON-12," "FREON-21," "FREON-22" AND "FREON-113"

HOW DOES MOISTURE AFFECT REFRIGERATION VALVE OPERATION?

No. 9 of a Series

The "sticking" expansion valve, so frequently a source of complaint, many times may be the result of moisture in the refrigeration system. Here are some basic facts about expansion valve construction and moisture which will help everyone to understand why the two don't belong in the same system.

For example, the orifice, through which the liquid refrigerant passes in the expansion valve, is, of necessity, a very narrow opening in the shape of a doughnut, and

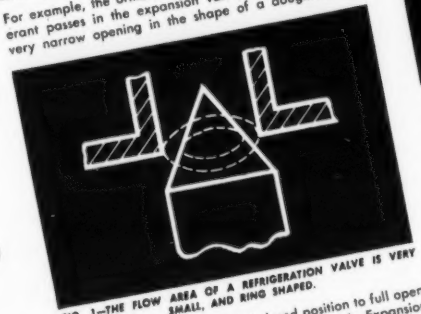

FIG. 1—THE FLOW AREA OF A REFRIGERATION VALVE IS VERY SMALL, AND RING SHAPED.

the needle movement from full closed position to full open is only a few thousandths of an inch. Expansion valves do this way because the flow of liquid must be extremely fine, a droplet of

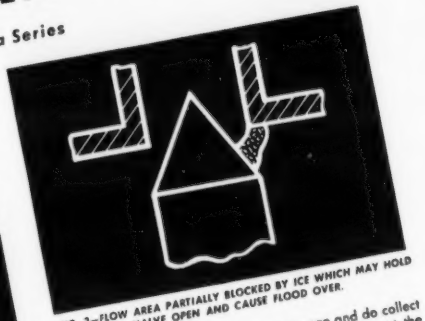

FIG. 3—FLOW AREA PARTIALLY BLOCKED BY ICE WHICH MAY HOLD VALVE OPEN AND CAUSE FLOOD OVER.

Smaller amounts of water in the system can and do collect at the expansion valve orifice and partially obstruct the flow area.

If this occurs when the valve is throttling closely, a starved evaporator will result. If it occurs when the valve is wide open, it can cause the needle to remain off the seat, resulting in a flood over.

A large amount of free water in the system can pass entirely through the orifice of the expansion

Space limitations prevent giving the full text of this service help on this page. The service bulletin illustrated here is complete. Write for your copy.

Write

FOR YOUR COPY OF THIS SERVICE HELP

This is the ninth of a series of service bulletins, published by Detroit Lubricator Company. They are printed on 8½" x 11" paper, punched for a standard loose leaf binder. Copies may be had on request. Write for yours.

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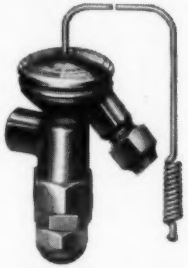

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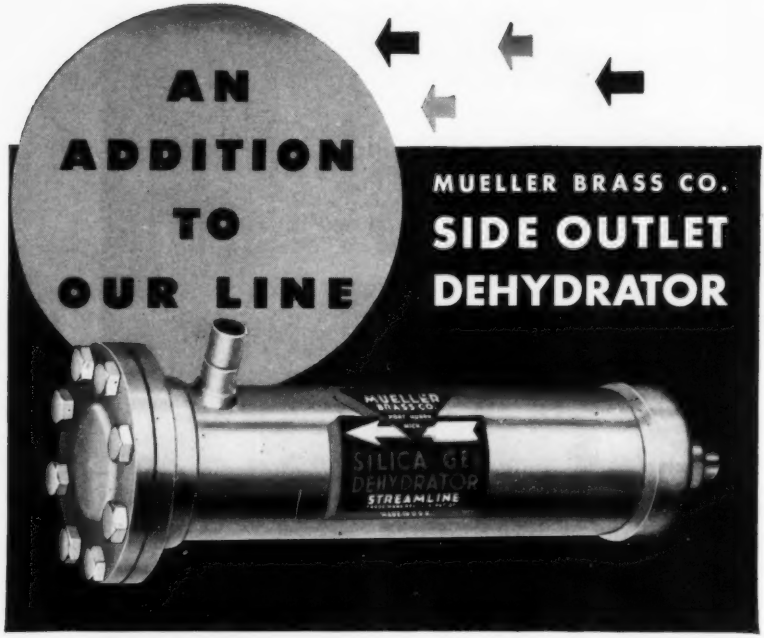

The Mueller Brass Co. Side Outlet Dehydrator permits the renewal of the drying agent without breaking the line. All that is necessary is to remove the flanged end, remove the exhausted drying agent, and replace with new.

All Mueller Brass Co. Filters and Driers are provided with a CONE SCREEN OUTLET, a specially designed filtering element that adds immeasurably to the life and efficiency of Driers and Filters.

Fine crystals or powder, which continually break away from the Dehydrating Agent, are forced to the base of the cone, leaving the center and tip of the screen open for the free flow of refrigerant. The cone screen itself is filled with pure wool which traps any particles that are sufficiently fine to pass through the screen mesh.

Particular attention has been given to screen areas in Mueller Brass Co. Filters and Dehydrators so that each size permits efficient passage to the maximum refrigerant volume that is used in a particular size refrigerant line.

Your jobber handles a complete line of Mueller Brass Co. refrigeration products. Order through him.

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CURTIS Uses MUELLER BRASS CO. Valves and Fittings in the Assembly and Construction of CURTIS PACKAGED AIR CONDITIONING UNITS

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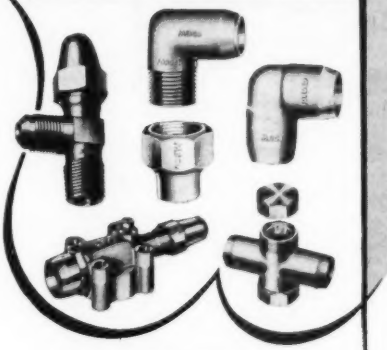

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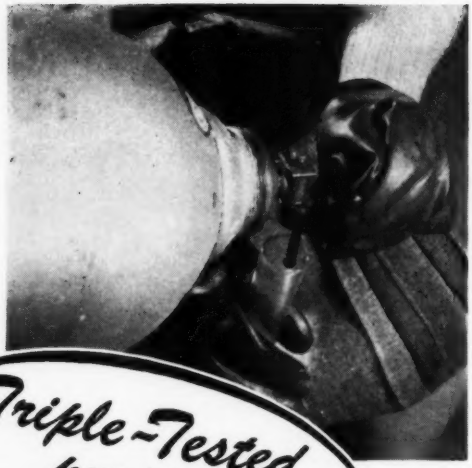
Curtis Packaged Air-Conditioning Units provide a complete air-conditioning system in one compact, attractively designed unit that cools, dehumidifies, circulates and filters the air. Designed for long life, low-operating cost and quiet, dependable operation, like all Curtis products, these units embody Curtis' 91 years of successful manufacturing experience.

Building only the best has long been the policy of Curtis Manufacturing Company since its establishment in 1854.

MUELLER BRASS CO. PORT HURON, MICHIGAN

V - METH - L is tested for moisture . .



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. . . then tested for boiling point . .

. . . and finally for acidity.

VIRGINIA Refrigerants are produced under rigid laboratory control. V - METH - L (Methyl Chloride) is subjected to the three separate tests pictured at left. ESOTOO (Liquid Sulfur Dioxide) and other VIRGINIA products are made under similar conditions of continuous testing. Specify VIRGINIA Refrigerants . . . get "tested PURITY for service SURETY."

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Self-Clamping

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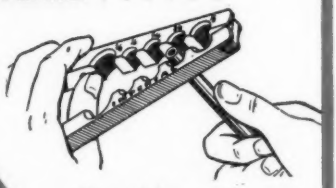
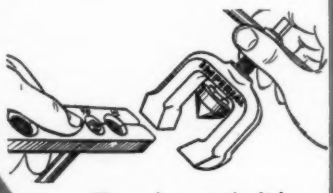
HERE ARE THE THREE SIMPLE STEPS IN MAKING A FLARE . . . . . .



1 Spread bar and insert tubing in proper opening.



2 Close bar and slide yoke over hinged end of bar.

3 Center spreader cone over tubing and turn compressor screw down firmly. The result—a perfect 45° flare.

With the new Imperial Self-Clamping Flaring Tool you merely insert tubing, slide self-clamping yoke over the wedge-shaped bar and flare. What could be more simple?

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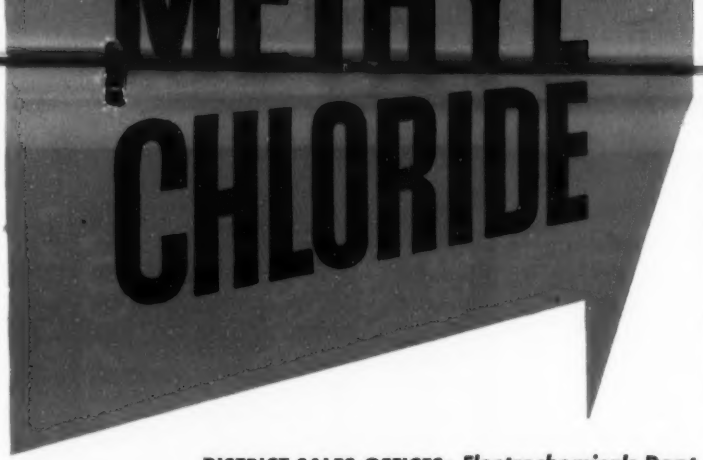

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3. **LOW VOLUME OF NON-CONDENSABLE GASES**—Specifications for "Freon" refrigerants are such that non-condensable gases in the vapor phase do not exceed 2 per cent . . . eliminating risk of the useless gases lodging in condensers.

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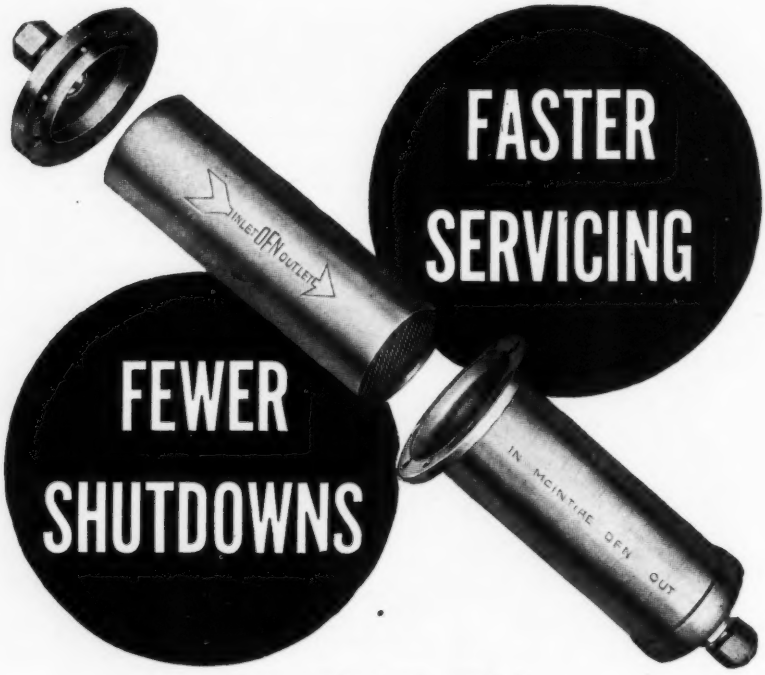

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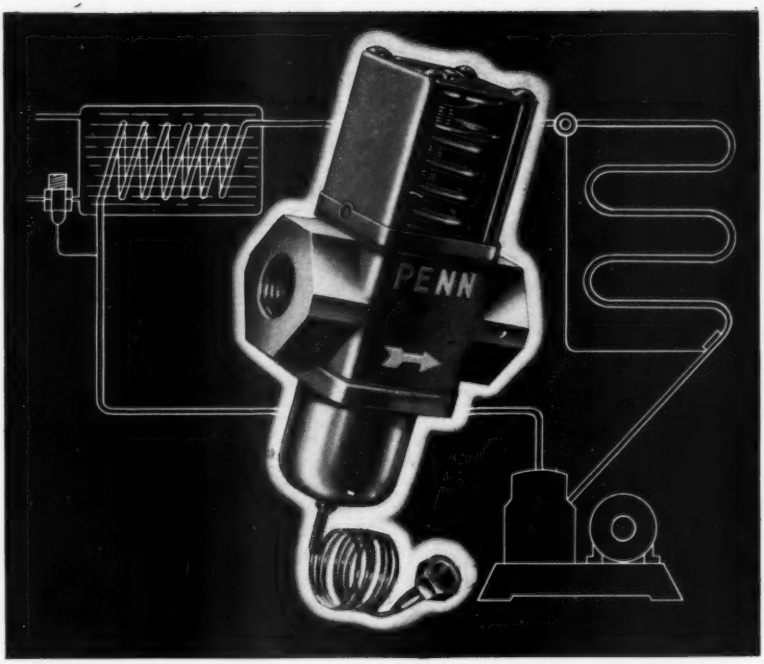

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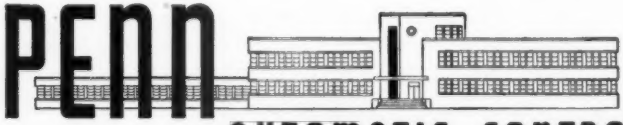

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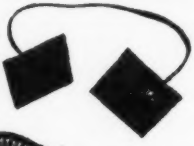

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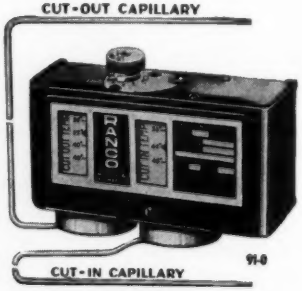

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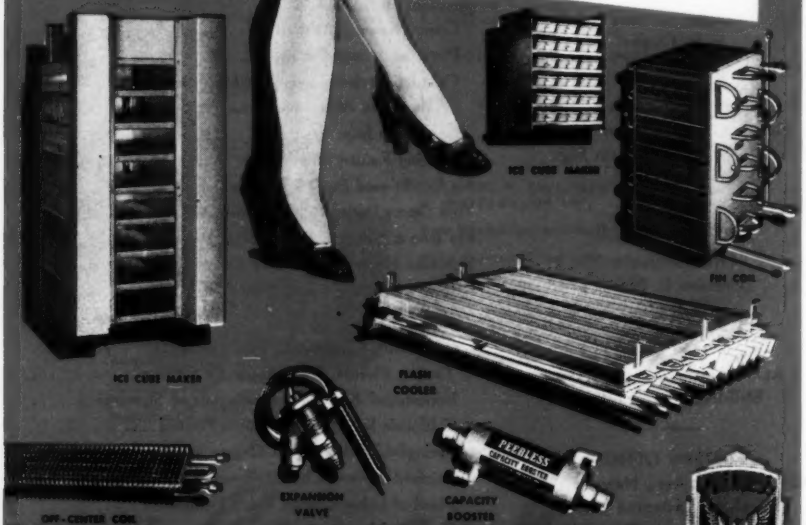

PEERLESS OF AMERICA, INC.

Executive and General Sales Offices

333 NORTH MICHIGAN AVENUE, CHICAGO 1, ILLINOIS, U. S. A.

IN THIS ISSUE—

As new equipment becomes available the service and installation contractor will be branching out to the relatively untouched fields of application where he may often find it necessary to build suitable cold rooms.

One such field is the fruit and vegetable farms and the cold rooms required to store the produce before shipment. The article entitled "Insulation for fruit and vegetable storages" by S. C. Martin on page 23 is a helpful guide to the building of cold rooms.

The City of Chicago has added a new provision to the code governing present and future water cooled refrigerating installations which, if maintained will prove very costly to users of the equipment. A protest from the refrigeration interests in Chicago has been made to the Mayor of the city. Read it on page 29.

"Reverse Cycle Refrigeration" appearing on page 30, is a practical discussion of this very interesting application of refrigeration. It lays down definite lines of approach to the problem and clearly defines its limitations.

The second article entitled "Low-Temperature Refrigeration" appears on page 34. It discusses the refrigerants and kind of equipment suitable to this work.

"Electric Instruments—Principles of Operation" by G. F. Gardner (third article) appears on page 37. Wattmeters are discussed in this article with current and voltage relations and power factors explained graphically.

One of the Service Pointers appearing on page 40 this issue, explains how you can temporarily replace a G.E. control with a standard cold control and relay. A wiring diagram is provided.

Fair plans of compensation for service men employed by service contractors have been given a great deal of thought and many plans have been tried with varying degrees of success. Some discussion of the problem is provided in one of the Questions and Answers contained on page 42.

Repair shops cannot increase their ceiling prices because they have granted increases in pay, according to a new O.P.A. ruling. See page 50.

The Refrigeration supply jobbers of the country are turning to the modern idea of island displays and self service. Refrigeration Supplies Distributor, Los Angeles, Calif., pictured on page 51 is the latest one we have heard of.

An interesting series of educational films on refrigeration service is being circulated among chapters of the Refrigeration Service Engineers Society to be shown as a part of their educational program. For a schedule of showings see page 53.

COVER

THE man in the Brownie woolen helmet and the gloves is about to enter the quick freezing room of the Maxson Food System plant at Queens Village, N. Y., with partially pre-cooked complete meals assembled on cardboard plates and sealed into specially treated envelopes for storage.

This is the new frozen food system which has supplied, in ten months, some 500,000 meals to the Naval Air Transport Service and which is about to go into consumer production on a large scale, with plants to be built in several parts of the country. The 1946 output is expected to be about 25 million meals, with a substantial increase next year. The Queens Village plant has facilities for the storage of one million meals and can produce 500,000 meals a month.

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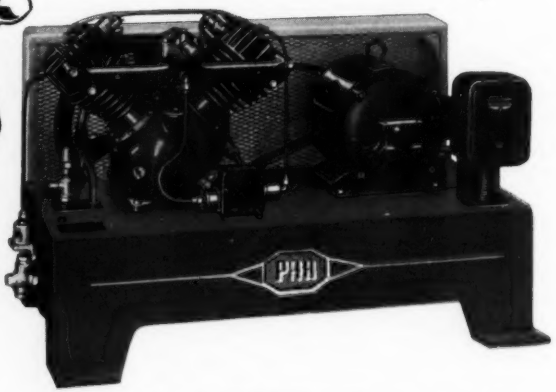

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TOLEDO 1, OHIO, U. S. A.

Photo by Armstrong Cork Co.

Cardboard insulation efficiently protects the apples while they are held in this 14,000-bushel Massachusetts storage.

Insulation for Fruit and Vegetable Storages

By S. C. MARTIN*

"Refrigerated from field to consumers table" is no longer a dream of the fruit and vegetable growers —it is fast becoming a reality. Many of the larger growers have already built cold storage rooms on the growing fields where their products may be stored under proper temperatures for the period between harvesting and shipment. Others are ready to follow. The refrigeration contractors of these rural areas will find a lucrative field of endeavor in this work.

PRESERVATION of fruits and vegetables to prevent excessive losses from spoilage always has been one of the greatest problems in the fruit and vegetable industry. This problem has been greatly minimized by the proper use of cold storage rooms of good construction. Cold storages also permit these highly perishable foods to be held for longer periods of time for favorable market conditions.

Because low temperatures slow down the ripening and deterioration of fruit and vegetables, properly built insulated refrigerated storages have become an essential part of the entire fruit and vegetable industry. No matter at what stage fruit and vegetables are held, whether it be farm or orchard, commercial warehouse, wholesale jobber or retail store, cold storage space is essential for protection from losses.

Until the advent of corkboard, almost fifty years ago, many different types of materials had been used to maintain low temperatures. These materials included shavings, hay, cottonseed hulls, fibrous mineral materials, cinders, charcoal—in fact anything that could be packed loosely. Construction in the form of double walls of massive masonry had been tried, too, sometimes with air spaces built in and sometimes with the space poured full of pitch or asphalt.

* Manager, Industrial Insulation Department, Building Materials Division, Armstrong Cork Company.

[redacted]

Photo by Armstrong Cork Co.

Even with earlier types of refrigeration, such insulation methods and materials were makeshift at best. All of them dropped in efficiency because, through moisture infiltration, they became wet or filled with ice. Now that mechanical refrigeration can offset weather conditions and produce the temperatures needed to dissipate the heat generated by fruits and vegetables, correct insulation construction becomes of paramount importance to permit accurate control and to prevent excessive operating costs. And only correct insulation construction can withstand the high humidity conditions used to prevent wilting or shriveling. With the insulation materials of today, good construction is possible and maintenance and operating costs are lower and profits are higher.

[redacted]

For fruit and vegetable storage construction good low-temperature insulation should possess four major characteristics. They are:

1. Low thermal conductivity for greater insulating efficiency.

2. Permanent resistance to moisture absorption, since water is a good heat conductor. This is doubly important because unusually high humidity conditions are required, ranging from 70 to 95 per cent.

3. Structural strength, so that the insulation will be self-supporting and stay permanently in place without sagging, settling, shrinking, swelling, or warping; and will support a finish.

4. Freedom from any liability to rot or mold or harbor vermin and should not retain odors or have an objectionable odor itself

[redacted]

The thermal conductivity of corkboard is very low—only 0.27 (Btu. per sq. ft. per hr., per 1″ thickness, per degree F.) at 60° F. mean temperature. It retains its efficiency under severe service conditions. It weighs approximately .65 lb. per board foot.

Corkboard insulation is naturally moisture resistant. High in structural strength, it is self-supporting and will not settle. It provides a substantial base for finishing materials, is sanitary, is free from objectionable odor, will not retain odors, is fire resistant, and will not harbor vermin. Reasonable installation costs coupled with dependability and durability make corkboard a truly economical investment. Sizes are 12″, 18″ and 24″ x 36″; thicknesses 1″, 1½″, 2″, 3″, 4″ and 6″.

Besides standard corkboard, there are two types made to meet special installation and service conditions. These are: super-service corkboard, made even more resistant to vapor infiltration and moisture by application at the factory of a special asphalt mastic coating on each face of the

corkboard, and mastic finish corkboard discussed under "Finishes." Supplied in size 12" x 36"; thicknesses 1", 1½", 2", 3", 4", and 6".

[redacted]

Mineral wool board offers lasting insulating efficiency combined with practical workability. It equals Federal Specifications HH-M-371 for board or block form insulation; has a low thermal conductivity of 0.33 at 75° F.; is moisture resistant; possesses structural strength; is odorless; is easily handled and erected; bonds firmly with finishing materials; and weighs approximately 1.25 lbs. per board foot. This insulation is made in a standard size 12" x 36"; thicknesses 1", 1½", 2", 3", 4".

[redacted]

Foamglas gives dependable insulating efficiency coupled with the permanence of glass. It has a closed cellular structure which will not permit the passage of air or moisture; therefore single-layer construction can be utilized. Foamglas is absolutely airproof, moistureproof, fireproof, and offers effective, lasting insulation. It is rigid and has unusual structural strength. Its thermal conductivity is 0.45 at 50° F., and it weighs 10 to 11 lbs. per cubic foot. This material comes in 12" x 18" blocks; thicknesses 2", 3", 4", and 5".

[redacted]

Combining corkboard and Foamglas, this insulation construction takes full advantage of the best properties of both materials. Erected in accordance with standard specifications, corkboard is used because of its natural moisture resistance, exceptionally low thermal conductivity, and its high structural strength. Foamglas is used because its glass cellular structure makes it a positive, permanent seal against the infiltration of moisture and vapor.

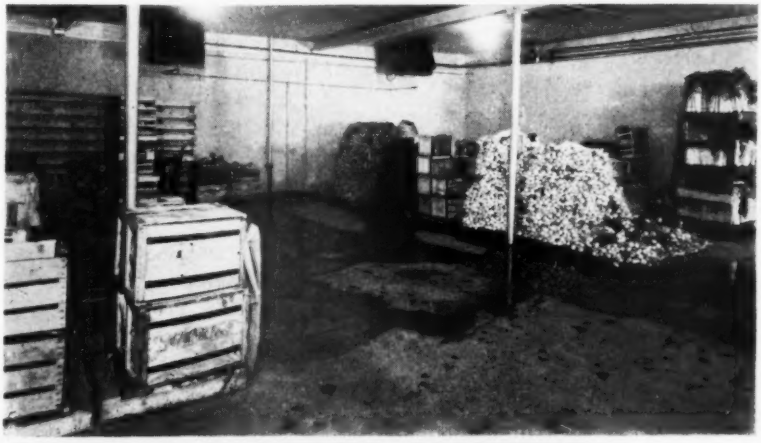
[redacted]

Adequate and efficient insulation more than any other factor will determine the final economy of a cold room or refrigerated fruit and vegetable storages. Cold rooms (except freezers) may be located in any part of the building and may be built as single or multiple units. Multiple cold rooms should be built in one block, if possible, for greater economy.

[redacted]

Structural walls, floors, and ceilings should be of solid construction; both mono-

* Reg. U. S. Pat. Off. Product Mfg. by Pittsburgh Corning Corp.



[redacted]

Photo by Armstrong Cork Co.

lithic concrete and solid brick with flush joints are recommended constructions. Avoid air spaces such as occur in hollow tile concrete and cinder block, or sheathed studs of above ceiling joists. If such spaces are unavoidable, as in an existing building, they should be left as open as possible for free air circulation through them. For partitions and interior walls, where building walls are not used as a base for the insulation, self-sustaining or solid walls of the insulating material are recommended. When the existing ceiling height is greater than that needed for the cold room, a false ceiling is recommended with the insulation laid on top.

Airproofing

There is always the problem of air infiltration with its resultant vapor condensation which is harmful whether it occurs in the building structure or the insulation. Solid masonry construction aids airproofing. Brick used should be of a hard, dense type. All masonry walls should receive a leveling coat of portland cement plaster, and when dry this should be air-proofed with an asphaltic paint.

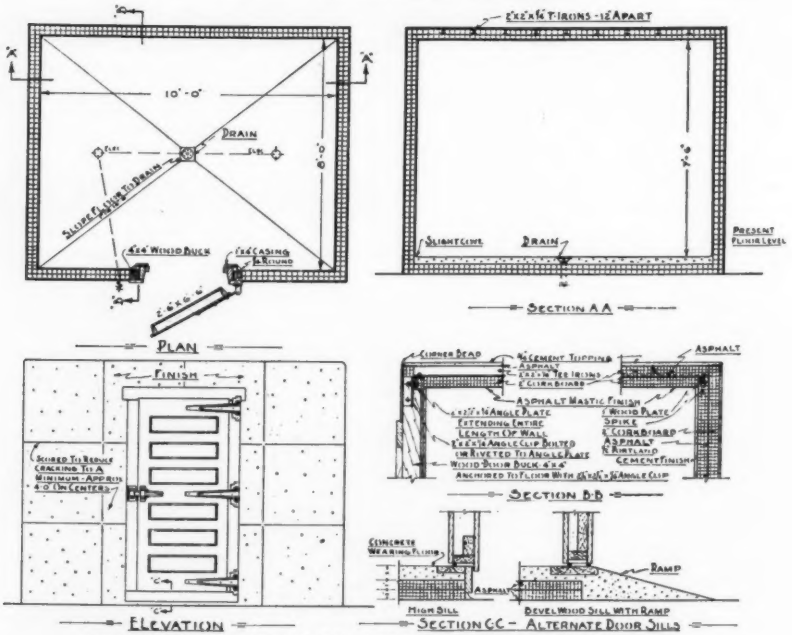
Doors

The doorway of an insulated room is the point of greatest loss of refrigeration. It is true economy to use a well-built door.

Finishes

All insulation should be finished with material which is airproof, odorless, and mois-

Fruit and Vegetable Storage Room Diagram



CONSTRUCTION DETAILS OF A STORAGE ROOM WHICH CAN BE BUILT WITHIN AN EXISTING BUILDING

This diagram shows the construction details of a fruit and vegetable storage room designed to be erected within an existing building. This particular construction utilizes solid corkboard partitions. The basic specifications remain the same, except for the exterior finish, when the corkboard insulation is erected against masonry or frame construction. The thickness of the insulation also varies according to the temperature maintained within the storage room.

Drawing by Armstrong Cork Co.

Photo by Armstrong Cork Co.

tureproof—to withstand the controlled humidity conditions customarily maintained in modern storages. It should be light in weight and not subject to cracking. It should bond securely and resist bumps and abrasions. Reasonable cost, good appearance, and availability also should be considered.

There is available an asphalt plastic finish, easily applied, which bonds securely to all insulation materials, has high air and moisture resistance, does not crack, is light in weight, and in general is excellent for low-temperature insulation work on walls and ceilings. For Foamglas insulation this is the only recommended finish.

Portland cement plaster has a wide acceptance for cold storage work and offers a hard monolithic finish which provides the in-

Photo by Armstrong Cork Co.

sulation with excellent protection against rough service conditions. (Portland cement can be used on walls of corkboard or mineral wool board; it must not be applied directly to Foamglas.)

Mastic Finish

Mastic finish is ironed onto corkboard at the factory and is especially impervious to air and moisture infiltration. It is particularly valuable where conditions do not permit the mixing or application of a finish on the job.

How to Determine Minimum Thicknesses of Insulation

Table I gives the recommended temperatures, humidities, and minimum thicknesses of insulation materials for storage of typical fruits and vegetables. All data given are based on standard specifications for erection. Weather and humidity conditions may modify this table in some instances.

Thicker Than Standard Insulation

There are several instances where thicker-than-standard insulation is desirable:

1. When extremely accurate humidity control is desired in addition to temperature control.

2. On ceilings which form the roofs of buildings.

3. In localities where summer temperatures are high or long periods of heat prevail.

The efficiency and dependability of any insulation job are determined by three factors: (1) Quality of materials—(2) Excellence of workmanship—(3) Engineering skill.

TABLE I SHOWING TEMPERATURES AND INSULATION THICKNESSES FOR STORAGE OF FRUITS AND VEGETABLES AS RECOMMENDED BY ARMSTRONG CORK CO.

Product	Temperature Ranges °F.	Humidity Ranges Per Cent	Recommended Corkboard Thicknesses	Recommended Mineral Wool Board Thicknesses	Recommended Combination* Thicknesses
Apples	30 to 32	85 to 88	4"	5"	3" + 2"
Apricots	31 to 32	80 to 85	4"	5"	3" + 2"
Asparagus	32	85 to 90	4"	5"	3" + 2"
Avocados	40 to 55	85 to 90	3"	4"	2" + 2"
Bananas					
Ripening	62 to 70	85 to 95	4"	5"	3" + 2"
Holding	56	85 to 95	4"	5"	3" + 2"
Berries	31 to 32	80 to 85	4"	4"	3" + 2"
Cabbage	32	90 to 95	4"	5"	3" + 2"
Cantaloupes	32 to 34	75 to 78	4"	5"	3" + 2"
Carrots	32	85 to 98	4"	5"	3" + 2"
Cherries	31 to 32	80 to 85	4"	5"	3" + 2"
Celery	31 to 32	90 to 95	4"	5"	3" + 2"
Fruits (Dried)	32 to 50	70 to 75	3"	4"	2" + 2"
Grapes					
European	30 to 31	80 to 85	4"	5"	3" + 2"
American	31 to 32	80 to 85	4"	5"	3" + 2"
Grapefruit	32 to 55	85 to 90	4"	5"	3" + 2"
Lemons	55 to 58	85 to 90	3"	4"	2" + 2"
Limes	45 to 48	85 to 90	3"	4"	2" + 2"
Melons	35 to 40	75 to 85	3"	4"	2" + 2"
Onions	32	70 to 75	4"	5"	3" + 2"
Oranges	32 to 34	85 to 90	4"	5"	3" + 2"
Peaches	31 to 32	85 to 90	4"	5"	3" + 2"
Pears	29 to 31	85 to 90	4"	5"	3" + 2"
Peas	32	85 to 90	4"	5"	3" + 2"
Pineapples					
Mature Green	50 to 60	85 to 90	3"	4"	2" + 2"
Ripe	40 to 45	85 to 90	3"	4"	2" + 2"
Plums (Prunes)	31 to 32	80 to 85	4"	5"	3" + 2"
Potatoes	36 to 50	85 to 90	4"	5"	3" + 2"
Tomatoes					
Ripe	40 to 50	85 to 90	3"	4"	2" + 2"
Mature Green	55 to 70	85 to 90	3"	4"	2" + 2"

*Combination of corkboard and Foamglas. First figure is inch of Foamglas, second figure is corkboard.

CITY OF CHICAGO CODE ADDITIONS COSTLY TO REFRIGERATION INDUSTRY

A RECENT addition to the City of Chicago Code requires that an open connection vented to the outside atmosphere be installed between the condensing unit and water supply line on all water cooled refrigeration and air conditioning units. Notices to this effect have been sent to all owners of such equipment by the City Water Dept. The inspection department has notified all contractors that a gas tight surge tank must be used with a 2" gas relief pipe extending to the outside atmosphere.

In order to accomplish this demand it would be necessary to install a gas tight tank, a motor and pump, a float control and some type of motor control. Since this equipment would be required even on ½ hp. water cooled condensing unit it can be seen that the cost of complying with the new code would very nearly equal the cost of the refrigerating system.

Pointing out these facts and the lack of any need for such equipment, Chicago refrigeration interests are appealing, in the following letter, to Mayor Kelly for relief from the code's provisions pointing out the inadvisability of its adoption.

Honorable Edward J. Kelly
Mayor of Chicago
Dear Mayor Kelly:

The refrigeration and air conditioning industry is confronted with an extremely serious situation occasioned by recent regulations of the City of Chicago.

Since 1930 this industry has installed approximately 20,000 refrigeration systems in the City of Chicago. All of these installations were made in accordance with the City Code, as administered by the Boiler and Refrigeration Inspection Department, and Chicago has been singularly free from accidents.

Within the last sixty days the Department of Public Works, through the Water Pipe Extension Division, issued orders that when city water is used in connection with refrigeration and air conditioning equipment, an open connection be provided between the water supply and the condensing unit. Practical compliance would require that a surge tank, pump, motor, float assembly, controls, and drain be installed between the water supply and the condenser. The purpose of this regulation is supposedly to prevent the contamination of the water supply by the refrigerant in case of a break in the condenser.

The Boiler and Refrigeration Inspection Department has found it necessary to issue a regulation that when such surge tank is used, tank must be of gas tight construction, with a vent to the outside atmosphere. This regulation is necessary to prevent the possibility of gas diffusing throughout the building.

For over 20 years it has been the custom of this industry, not only in the City of Chicago but throughout the whole United States, to make a direct connection to the city water supply line with an automatic pressure actuated water valve which would effectively prevent refrigerant from backing into the city water mains. If the water coil of the condenser should break, the water and refrigerant would take the path of least resistance and pass off to the sewer. With a drop of pressure in the condenser of from 15 to 25 pounds (gauge) due to the condenser coil breaking, the automatic water valve will close and prevent a backing up of water and refrigerant gas into the drinking water supply.

This method has been approved by the Boiler and Refrigeration Inspection Department of the City of Chicago and all states and cities throughout the country that regulate the installation of refrigeration systems.

We know of no case where the water supply was endangered by the backing up of refrigerant from the system, and the one or two cases that have been cited by the Department of Public Works did not seriously affect the water supply, and were on systems that had been installed previous to the passage of the 1930 ordinance.

Costs 25-100% Higher

The enforcement of this new regulation would increase the cost of each installation from 25 to 100 per cent, and we feel that the people of the City of Chicago should not be burdened with this additional expense, and that it is unreasonable and unnecessary.

We are also faced with the fact that compliance with an order of one department will not satisfy the requirements of another department in the City service, and our installations are practically stopped.

The next few months is the busiest time in the industry; reconversion is being seriously delayed; and the preservation of foods will be impaired.

(Continued on page 45)

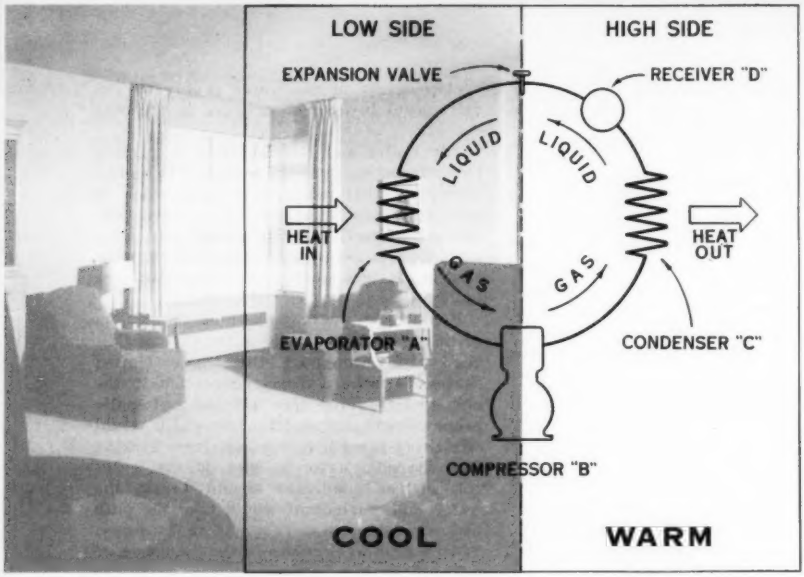


FIG. 1.

Reverse Cycle

By GARDNER C. SAVAGE*

DURING the past few years considerable interest has been aroused in reverse cycle refrigeration, or the "heat pump" as it is sometimes called, and technical writers have ably presented its theory and application in various engineering journals.

But, unfortunately, some feature writers have described the system in such glowing terms that the Sunday supplement reader usually regards all other heating systems as already obsolete.

It is true that the heat pump has some very desirable features—such as unexcelled convenience and cleanliness. But, it must also be recognized that it has some very definite drawbacks. In other words, there are applications where the heat pump is the ideal system; but there are just as many more where it shouldn't even be considered.

Before deciding the applicability of the heat pump to any particular installation, the principle of the reverse refrigeration cycle should be clearly understood.

Figure 1 illustrates the basic refrigeration cycle common to all mechanical refrigeration systems, both conventional and reverse cycle.

A liquid refrigerant is boiled, at a low temperature, in evaporator "A." In boiling the refrigerant absorbs a very considerable amount of heat, merely by changing state from a liquid to a gas. This is the latent heat of vaporization.

The gas, created by the boiling refrigerant, is drawn through the suction line to compressor "B". Here the pressure upon the gas in increased.

Leaving compressor "B", under high pressure, the gas flows through the discharge line to condenser "C". Being under considerable pressure the refrigerant gas will liquefy in condenser "C", at a much higher temperature than it would at the low pressure existing in the evaporator. On liquefying the latent heat of vaporization is surrendered, to the cooling medium surrounding the condenser, and carried away.

The liquid refrigerant is then drained to receiver "D", where it is stored until required by evaporator "A".

The operation of the system is based upon the fact that the refrigerant, as will all

*The Trane Co., LaCrosse, Wis.

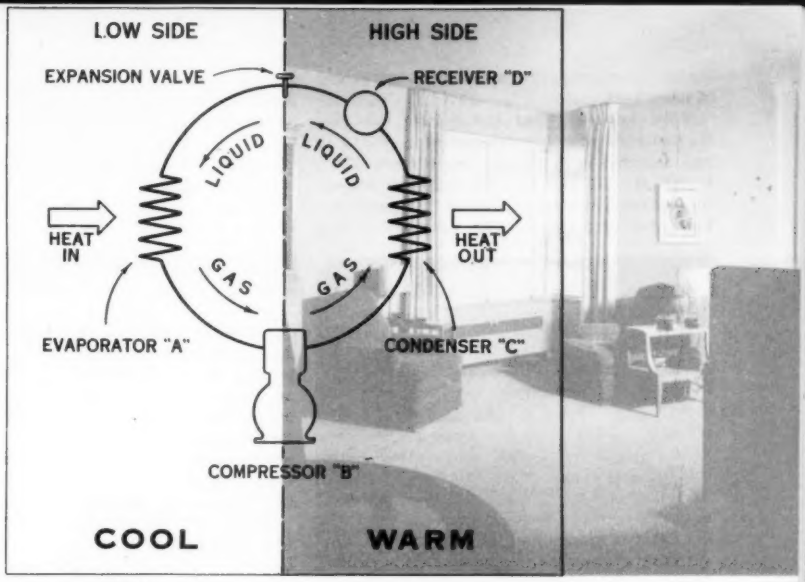


FIG. 2.

Refrigeration

fluids, boils at a temperature relative to the pressure upon it. A fluid will boil, at a temperature corresponding to its saturation pressure, if heat is added. If heat is extracted, it will condense.

"Freon-12," one of the common refrigerants, has a boiling point of 40° F at a pressure of approximately 37 lbs. per square inch. At a pressure of approximately 126 lbs. per square inch it has a boiling point of 105° F.

Therefore, if evaporator "A" is surrounded by 50° air and the pressure in the evaporator is maintained at 37 lbs. gauge, heat will flow from the air to the cooler refrigerant—causing it to boil. The resultant gas is drawn into the compressor, where its pressure is increased to 126 lbs. gauge. Heat is then removed when water or air, at approximately 75 or 80° F, is circulated around the condenser—heat flows from the hot refrigerant gas to the cooler air or water and liquefaction takes place. The liquid is now ready to return to the evap-

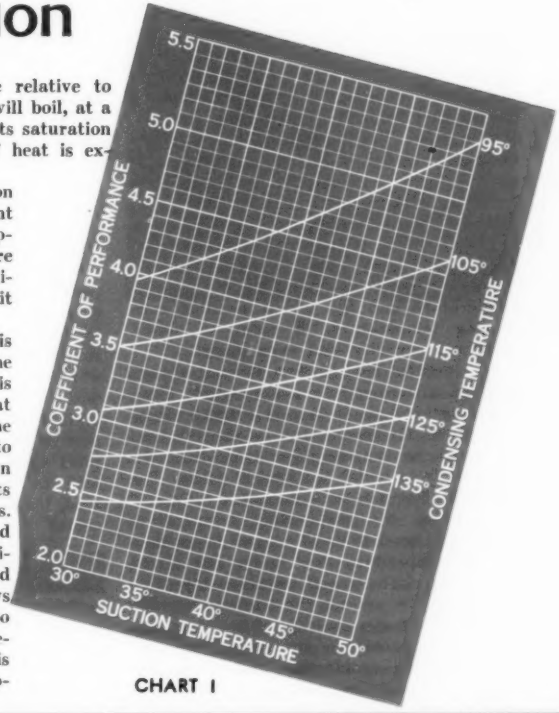


CHART I

orator for re-evaporation and the absorption of more heat.

Note, however, that the system has extracted heat at a low temperature (50° F) and rejected it at a high temperature (75° to 80° F). It has pumped the heat out of the system against a higher temperature than that at which it was absorbed.

[redacted]

Figure 2 illustrates the so-called "heat pump", or reverse refrigeration cycle, as applied to heating. Notice, particularly, that the basic refrigeration cycle is exactly the same as in Figure 1. The system is still extracting heat at a low temperature and discharging it at a high temperature—only the utilization of the system has changed.

Here, instead of using the cooling effect and wasting heat at the condenser, the cooling effect is wasted and the heat utilized. The system becomes more complex only when, for economic reasons, the same system is used for both winter heating and summer cooling. This is invariably the case.

Recognizing the heat pump as a simple refrigeration system, it is possible to consider it in the light of the physical laws limiting the application of refrigeration equipment. It is well known, for example, that as the condensing temperature rises the discharge or "head" pressure increases and the power required by the compressor is increased. Similarly, as the evaporating or "suction" temperature decreases, the power required by the compressor increases while the capacity of the machine decreases. Obviously, it is desirable to operate the compressor at the highest possible evaporating temperature and the lowest possible condensing temperature, in order to obtain maximum capacity and save power.

In order for heat to flow, it must always go from a warmer to a cooler object. Thus, in extracting heat from cold outdoor air or well water, the temperature of the evaporator must be considerably lower than the medium from which the heat is taken. For example, if heat is to be extracted from cool outside air, the evaporating temperature must be at least 10 or 15 degrees lower than the air temperature—unless the size of the evaporator is increased unreasonably. This is because the greater the temperature difference, the faster the rate of heat transfer. In a like manner, the condensing temperature must be considerably higher than the temperature of the medium to which the heat is rejected. If air is being used to heat an occupied space, it is probable that air of at least 100° F, and probably warmer, would be used in order to keep the amount of air circulated within reasonable limits. This will mean that condensing temperatures ranging from 110° F to as high as 140° F must be used.

[redacted]

To further illustrate the effect of low evaporating temperatures, and high condensing temperatures, Chart 1 has been prepared. This Chart shows the effect of various conditions of evaporating and condensing temperatures upon the "Coefficient of Performance". The coefficient of performance is the ratio of the heat discharged at the condenser, to the power required by the compressor in equivalent heat units.

Thus, a system having a coefficient of performance of 3.0, and requiring a power input of 10 kilowatts, would have a heat output comparable to 30 kilowatts of electrical heat. Notice, however, that as evaporating temperatures fall and condensing temperatures rise, the coefficient of performance falls. As the lower the coefficient of performance the higher the cost of power for the heat delivered, it is apparent that an approximate practical limit can be placed upon the system in terms of coefficient of performance. In general it may be said that the system will not be economically feasible, even though used for both heating and cooling, unless the coefficient of performance is greater than 3.0.

Even more generally it may be said that few applications will be found for the heat pump unless a source of heat is available near 50° F, or higher, and unless the heating load in winter does not approximate the summer cooling load in Btu. per hour. In a warm climate heat may be extracted from outdoor air. In cooler climates a well supplying adequate water, at 50° F or higher, may be used as a heat source. Much will depend upon the construction of the building and its utilization—the lower the heating load, the more desirable the heat pump becomes.

[redacted]

Reverse cycle refrigeration, or heat pump systems, may be generally classified as direct and indirect. In a direct system, the heat absorbed is carried by the refrigerant directly to the air heating surface. In an in-

direct system, the heat absorbed by the refrigerant is transferred to an intermediate fluid, usually water, by which it is carried to the air heating surface. The indirect system is generally favored over the direct system, particularly on larger installations, because of its flexibility and ease of control. It is far easier to change the path of water, flowing through the piping, than to change the path of large volumes of air flowing through ducts or to readjust the refrigeration equipment.

It has been pointed out that the heat pump is simply a refrigeration system used for a different purpose. As such, it can be designed and built of standard refrigeration equipment. Since standard equipment has been proven by time, the operation of the system can be accurately forecast. Neither new gadgets nor untried principles are involved—as can be clearly demonstrated by the system shown in Figure 4.

Typical Indirect System

Figure 4 illustrates a simple indirect heat pump system, intended for both summer cooling and winter heating. A well, delivering water at 67° F. the year 'round, furnishes the water which is used as a source of heat in winter and for condensing purposes in the summer. The major equipment involved is a ten ton refrigeration condensing unit consisting of compressor (B) and condenser (C), and 8" x138" dry expansion water chiller (A), a 24"x42" 5 row type "OS" water coil (G), a 30 gpm. circulating pump (F) and a 30 gpm. well pump (E). All accessories are standard refrigeration and piping items available anywhere.

For this particular system, the summer cooling load is 120,000 Btu. per hour. Air in the amount of 3700 cfm. is circulated through the water coil (G), entering at 81.5° DB and 68.7° WB and leaving at 61.0° DB and 58.8° WB. During the winter season the quantity of air is reduced, by means of a two speed fan motor, from 3700 cfm. to 2500 cfm. During the heating cycle, air enters the water coil (G) at 65° F. and leaves at 114.5° F.

During the summer season, water is circulated between the chiller (A) and the water coil (G), at the rate of 30 gpm. The chilled water enters the water coil at 50° F. where, in absorbing heat from the air at the rate of 120,000 Btu. per hour, it is warmed to 58° F. Entering the chiller at 58° F. the water surrenders, to the refrigerant, the heat absorbed in the water coil. Water leaves the chiller at 50° F. and is returned to the water coil. The refrigerant, evaporating at 40° F. in the water chiller (A), is drawn to the compressor (B). There it is compressed to 126 lb. gauge pressure and delivered to the condenser (C). In the condenser both the heat absorbed in the chiller and the heat of compression, added by the

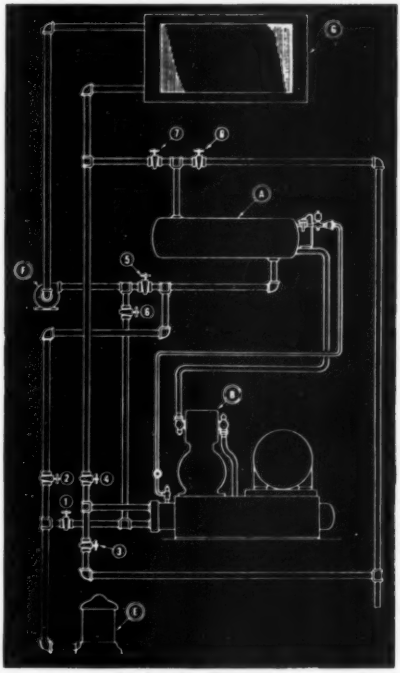


FIG. 3.

compressor, are removed by the 67° F. well water. The refrigerant then condenses to a liquid. The warmed condenser water is wasted to the drain, and the liquid refrigerant is stored in the condenser shell until required by the chiller (A).

During the winter season, the flow of water is redirected through the system. Instead of being pumped through the condenser (C), the well water is pumped through the chiller (A) and the water from the water coil (G) is circulated through the condenser (C) and back to the coil. The well water enters the chiller (A) at 67° F. and is cooled to 59.5° F., during which time

(Continued on page 45)

Low-Temperature Refrigeration

BY F. R. ZUMBRO AND TERRY MITCHELL*

Article Two

Nature's most dramatic example of low temperature refrigeration is to be found in Northern Siberia where temperatures go down to —90° F. It is here, in the icebergs and frozen swamps, that bodies of prehistoric mammoths, extinct for thousands of years, are reported in a state of perfect preservation. Another application of refrigeration may yet be found in the preservation, in museums, of such prehistoric discoveries.

TABLE I gives a comparison of the number of cubic feet of ammonia, Freon-22 and Freon-12, which have to be handled in compressors to produce one ton of refrigeration at the temperatures shown at the left. Note that three-stage compression is recommended with ammonia beyond minus 50, and with other refrigerants beyond minus 80. Freon-22 has the smallest volume of any of the refrigerants shown, as soon as we pass about minus 15.

In table II it is assumed that the saturated temperature in the evaporator is to be minus 40 deg. throughout. A complete study of this kind is very helpful in selecting the best refrigerant for any job. Allowance has been made for 10 deg. of superheat in each of the two stages. The figures speak pretty well for themselves.

To give a good idea of how the total compression ratios for 1-, 2- and 3-stage installations, we made table III. It applies to Freon-12 at a discharge temperature of 109.8 deg. As the suction temperature goes down, the total compression ratio changes from about 5¼ to more than 60. With suitable staging the ratio is kept well under 7. The figures for the cu. ft. per ton are of interest also.

Table IV compares seven different refrigerants when used to maintain a temperature of minus 100 deg. F. The melting points hardly have to be considered except in the case of ammonia and of carbon dioxide. The suction pressures show why Freon-22, Ethane, or Ethylene are most suitable for temperatures of minus 100 and below. The critical points are worth noting. Propane at minus 100 operates at 23.43 in. of vacuum—similar to F-22.

Typical booster compressors have a bore larger than the stroke. They are built with either two or four cylinders. The shaft is equipped with a mechanical seal, which holds either pressure or vacuum equally well. The oil pump is driven by the chain and together with a Cuno self-cleaning filter is below the

*Frick Company, Waynesboro, Pennsylvania.

TABLE I—SHOWING APPROXIMATE VOLUME OF VARIOUS REFRIGERANTS WHICH MUST BE HANDLED PER MINUTE IN FIRST STAGE TO PRODUCE LOW TEMPERATURES

	Ammonia		Freon-22		Freon-12	
Suct. Temp.	Cu. Ft. /Ton	No. of Stages	Cu. Ft. /Ton	No. of Stages	Cu. Ft. /Ton	No. of Stages
—100	...	.	40.4	3	...	.
— 90	...	.	29.0	3	48.4	3
— 80	31.2	3	22.5	2	37.6	2
— 70	21.7	3	16.85	2	28.2	2
— 60	15.9	3	12.76	2	21.35	2
— 50	12.51	2	9.82	2	18.20	2
— 40	9.4	2	7.76	2	13.00	2
— 30	7.2	2	6.26	2	10.30	2
— 20	5.6	2	5.04	2	8.30	2
— 10	4.4	2	5.21	1	6.69	2
0	3.5	2	4.19	1	6.82	1

TABLE II—COMPARISON OF TWO-STAGE REFRIGERATING SYSTEMS ALL AT —40 DEG. F. SATURATED EVAPORATOR TEMPERATURE

	Ammonia	Freon-12	Freon-22
Evaporator Press., Absolute	10.41 Lb.	9.32 Lb.	15.309 Lb.
Temp., Suct. to Booster	—30 deg.	—30 deg.	—30 deg.
Superheat in Suction Gas	10 deg.	10 deg.	10 deg.
Intermediate Press., Abs.	45.7 lb.	34 lb.	55.4 lb.
Intermediate Temp. Saturated	18.0 deg.	18.0 deg.	17.5 deg.
Temp., Suct. to Main Compr.	28.0 deg.	28.0 deg.	27.5 deg.
Superheat Suct. to Main Compr.	10 deg.	10 deg.	10 deg.
Condenser Press, Abs.	200 lb.	124.5 lb.	200 lb.
Condenser Sat. Temperature	96 deg.	96 deg.	96 deg.
Gross CFM/TR, 1st. Stage	15.23	20.85	11.7
BHP/TR 1st. Stage	1.409	1.375	1.310
Temp. Liq. to Exp. Valve	40 deg.	40 deg.	40 deg.
CFM/TR, 2nd Stage	3.385	6.4	3.94
BHP/TR, 2nd Stage	1.34	1.535	1.6
Vol. Eff., 1st. Stage	65%	67½%	72%
Vol. Eff., 2nd Stage	80%	73%	75%

TABLE III—FREON—12 SYSTEMS, 1, 2, & 3 STAGES DISCHARGE 109.8 DEG. = 124.5 LB. GAGE

Temp. Deg. F.	Suct. Press. Abs.	Total Comp. Ratio	No. of Stages	Interm. Press.	Ratio Per Stage	Cu. Ft. Min/Ton
0	23.87	5.22	1	...	5.22	6.82
—10	19.20	6.48	2	48.9	2.55	6.69
—20	15.28	8.16	2	43.7	2.86	8.30
—30	12.02	10.35	2	38.7	3.22	10.30
—40	9.32	13.36	2	34.1	3.66	13.00
—50	7.125	17.45	2	29.8	4.18	18.2
—60	5.365	23.2	2	25.86	4.82	21.35
—70	3.971	25.05	2	22.30	5.61	28.2
—80	2.885	43.2	2	19.00	6.58	37.6
—90	2.054	60.6	3	10.10	3.5	48.4

TABLE IV—PROPERTIES OF LOW-TEMPERATURE REFRIGERANTS

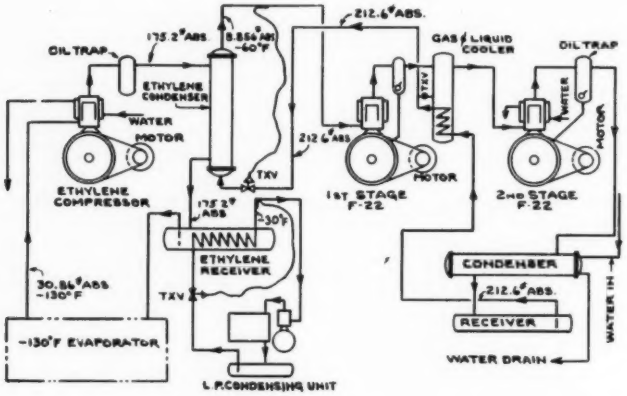
	Melting Point Deg. F.	Pressure for —100 Deg. F.	*Critical Points* Press. Gauge	Temp. Deg. F.
Ammonia	—107.86	27.4 in. Vacuum	1651	271.2
Freon-12	—252.7	27.01 in. Vacuum	567	232.7
Freon-22	—256.0	25.06 in. Vacuum	701	204.8
Ethane	—278.0	16 lb. approx. gage	718	89.8
Ethylene	—272.0	50 lb. approx. gage	749	49.5
Propane	—309.8	23.43 in. Vacuum	632	201.1
CO_2	— 69.9	7.52 lb. gage	1070	87.8

level of the oil in the crankcase. Booster machines with four cylinders measuring 15 by 10 or 17¾ by 12 are becoming a common sight in large quick-freezing plants. A battery of such machines is now being installed at Seabrook Farms, Bridgeton, N. J., and with the 20 or 30 compressors already in use there will bring the freezing capacity of the plant to one million pounds a day, this coming season.

A cascade system has the low-temperature refrigerant condensed by another refrigerant. See Fig. 6. This was originally done with carbon dioxide and ammonia a good many years ago. In this diagram the possible use of ethylene is shown for the first step of the cascade and Freon-22 for the second step, which is divided into two stages. Ethylene can produce temperatures below minus 150 while maintaining a pound or two of positive gauge pressure, and can be condensed at minus 54.4 deg. F. and 225 lb. gauge. (9.8 cu. ft. per ton). It will give temperatures down to minus 176.8 deg. F.

if needed. In this particular setup, a fourth compressor, in the form of a low-pressure condensing unit, is used for cooling the liquid ethylene in the receiver to minus 30 deg. F. or thereabouts, when the rest of the system is shut down: this keeps the pressure in the ethylene piping within safe limits, as the system is pumped down before the machine is stopped.

tor, depending upon the intermediate pressure; for the conditions here mentioned an increase of about 15% should cover the requirements. Furthermore, whenever synchronous motors are employed the starting torque and pull-in torque should be checked. It is suggested that whenever the duplex arrangement is employed, the starting torque be at least 50% and the pull-in 40%.



FLOW DIAGRAM - LOW TEMP. CASCADE SYSTEM - ETHYLENE & FREON-22

Fig. 6—A cascade system using Freon-22 in two stages for condensing ethylene, which is kept within safe pressures when the main plant is shut down by operating small machine.

One of the cardinal things in the design of a two- or three-stage system is the selection of motors of proper horsepower. There will be times when the load varies from the design conditions. For instance, suppose we have a plant designed for minus 50 deg. F. and that during certain periods this level increases to minus 28 deg. F. If the intermediate pressure in an ammonia two-stage system were 10 lb., under design conditions, the required horsepower on the booster compressor would be approximately 28.8 brake horsepower at minus 50 deg. saturated refrigerant suction temperature. If the suction pressure should go to minus 30 deg. saturated temperature, the discharge pressure would increase to approximately 20 lb., requiring 36.3 brake horsepower or an increase of some 28%. Hence the applied horsepower should be in the neighborhood of 30% greater than the design horsepower. The high-stage compressor should likewise have a factor of safety in its motor, depending upon the intermediate pressure; for the conditions here mentioned an increase of about 15% should cover the requirements. Furthermore, whenever synchronous motors are employed the starting torque and pull-in torque should be checked. It is suggested that whenever the duplex arrangement is employed, the starting torque be at least 50% and the pull-in 40%.

The port and valve areas of a booster compressor should be large in order to keep the pressure drops in the compressor at a minimum. This may be gauged by checking the properties of the refrigerant; for instance, with ammonia at minus 60 deg. F. a ½-lb. drop in pressure corresponds to an increase in volume of gas of 9.5%. At minus 70 deg. the same pressure would increase the gas volume 14%. At minus 80 deg., 20%. Even at the higher temperatures it is important; for instance, at minus 50 deg., 6.2%, at minus 40 deg., 5.5%.

At low temperatures, the height of the liquid in the evaporator should be taken into consideration. Assume we have an ammonia evaporator say 5 ft. in height, and it is considered to have 50% of head or liquid level at a suction pressure corresponding to minus 60 deg. F. The pressure at the bottom of the evaporator is 0.732 lb. above the outlet pressure from the evapora-

(Continued on page 45)

ELECTRIC INSTRUMENTS

Principles of Operation

By G. F. GARDENER*

Article Three

The third article of this series is designed to familiarize the reader with the construction and application of Wattmeters, showing in graphic form the current, voltage, and power relations in these instruments.

Wattmeters

Suppose we took the ammeter arrangement shown in Fig. 14 and connected it in a circuit as shown in Fig. 15, omitting the shunt and adding resistance in series with the moving element, instead. On alternating current, the deflection of the instrument pointer would depend on the product of the

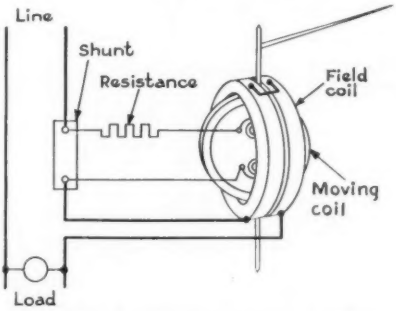


Fig. 14. An ammeter arrangement in which the field coil carries all of the line current, and the moving coil carries a definite fraction of it

instantaneous current flowing in the fixed and moving coils Since the current in the moving element is proportional to the line voltage, the instrument indication will be proportional to the product of the instantaneous voltage times the instantaneous line current. Or, in other words, the instrument will read watts, and the scale can be so

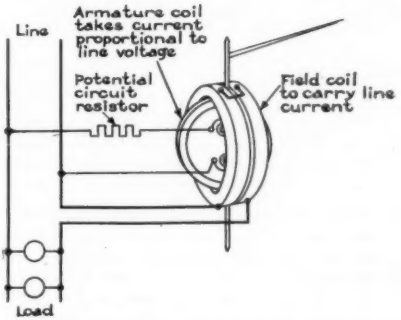


Fig. 15. Schematic view of a dynamometer element arranged to make a wattmeter

marked. If the maximum and other corresponding values of current and voltage occur at the same instant, as shown in Fig 16, that is, if the angle between them is zero, the load is said to have a power factor of unity, since cosine Ø (Ø is the angle between current and voltage) is equal to 1. If the current lags 30 degrees behind the voltage, as shown in Fig 17, the power factor is 0.866 lagging. Note how the instrument

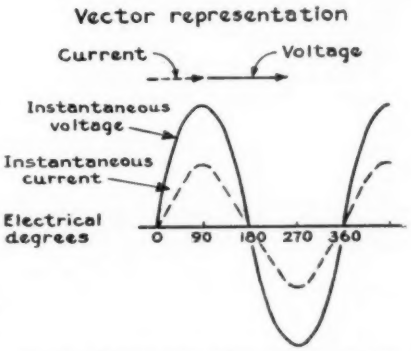


Fig. 16. Current and voltage relations in alternating-current circuit. Power factor equals 1.

*General Engineering and Consulting Laboratory, General Electric Co., Schenectady, N. Y.

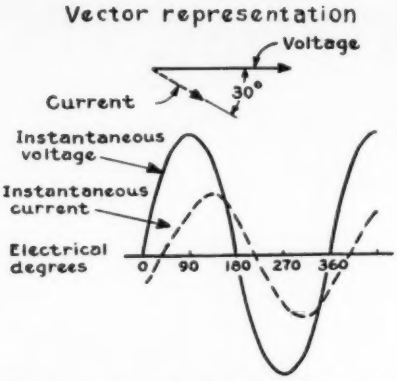


Fig. 17. Current and voltage relations in alternating-current circuit. Power factor equals 0.866, current lagging.

which we have shown in Fig 15 will respond to this condition, remembering that it always reads the quantity proportional to the instantaneous product of the volts and amperes. To take a specific example: we will draw lines corresponding to the voltage and current, values e and i, at a given instant, t, as shown in Fig. 18, and take their product.

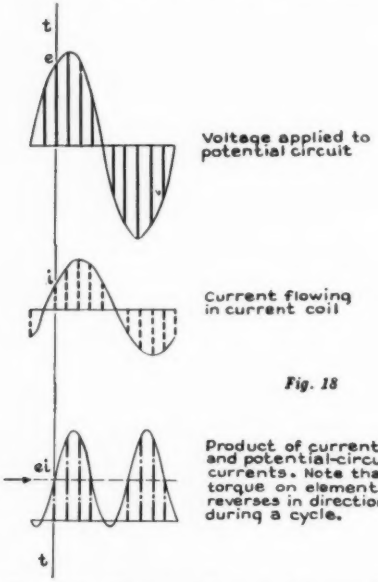
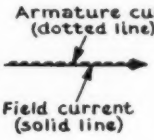

t
e
Voltage applied to potential circuit
i
Current flowing in current coil
ei
Product of current- and potential-circuit currents. Note that torque on element reverses in direction during a cycle.
t

Fig. 18

Fig. 18-19. Current, voltage, and power relations in a wattmeter

This product (e x i in Fig. 19) will be indicative of the torque on the moving element at that particular instant. Repeating this at suitable intervals, we obtain a torque curve which approximates that shown in Fig. 19. Note that the torque is positive in direction at certain intervals during the cycle, and negative in others. The instrument pointer will, of course, assume a position dependent on the average value of the torque over a period of time, since the instrument



Instantaneous current in field and armature coils of dynamometer voltmeter

Note that armature and field currents are always equal at any time

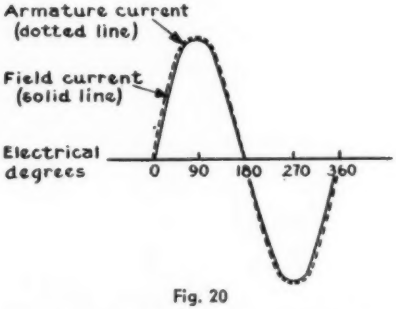


Fig. 20

element is not fast enough to respond to each impulse of a 60-cycle source Had a power factor of unity been selected, the torque would have been positive in direction at each instant.

While we are pursuing this analysis, let us apply it to the voltmeter which would be connected across the same line—plotting the torque curve over one cycle. Since, in a voltmeter such as is indicated in Fig. 12, the field and moving coils are connected in series, the instantaneous currents in each element are always in phase, regardless of the power factor of the line. To obtain the torque curve, we simply square the ordinates on the current curve. Because of the mass of the moving element, the instrument pointer will again assume an average posi-

tion with respect to the double-frequency torque pulsations. These conditions and the procedure are indicated in Fig. 20 and 21.

The dynamometer-ammeter element shown in Fig. 14 will also be subjected to the same continuous positive pulsating torque, since the current in the movable coil is always in phase with the line current which flows in the current coil.

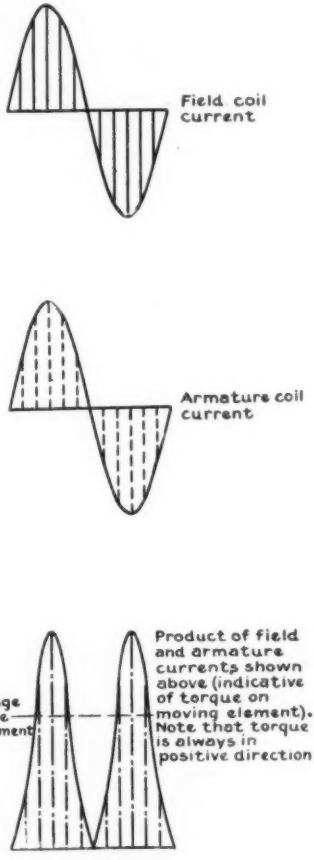

Field coil current
Armature coil current
Product of field and armature currents shown above (indicative of torque on moving element). Note that torque is always in positive direction
Average torque on element

Fig. 21

In closing this brief discussion on the manner in which these instruments indicate circuit conditions, the reader should always remember:

The dynamometer - voltmeter indicates *root-mean-square* (rms) voltage.

The dynamometer - ammeter indicates *root-mean-square* (rms) current.

The dynamometer - wattmeter indicates *average* power.

A wattmeter may be connected in circuit as shown in Fig. 22 or as in Fig. 23. Note that in one case the wattmeter potential-circuit loss is being measured; and in the other, the wattmeter current-coil loss. The potential-circuit loss of a typical portable 500-watt wattmeter, 5 amperes, 100 volts,

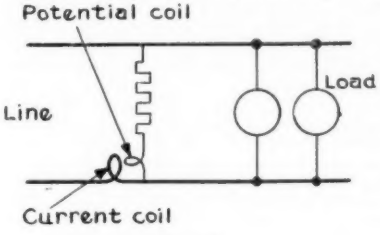
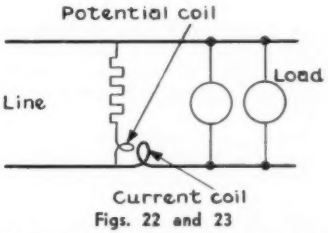


Fig. 22



Figs. 22 and 23

would be in the order of 2 watts at 100 volts; hence, if this instrument were connected as shown in Fig. 22, the watt reading would be 2 watts higher than the true value of watts consumed in the load. The current coil for the wattmeter previously described requires about 2 watts at about 5 amperes. Since the voltage is usually fairly constant, while the current varies, it is much easier to correct the readings for a constant potential-circuit loss than for a varying current-coil loss. Thus, the connection including the potential-circuit loss is usually preferred.

(To be continued)

"FROM baby food to a whole beef carcass, from orange juice to eggs for breakfast, from soup to a complete 'blue plate' for dinner—they're all being frozen. Even the staples, bread and milk, are in the frozen food picture, for frozen dough already is sold and frozen whole milk, a recent Army success, may become commonplace."

SERVICE POINTERS

Practical Solutions of Your Service Problems

THIS department is an aid to service engineers who are seeking new devices or methods to improve their work. All the service pointers have been supplied by the subscribers. THE REFRIGERATION SERVICE ENGINEER invites readers to submit "down-to-earth" practical service and installation information. Five dollars will be paid for each pointer published. Every service engineer has one or more "kinks" that have proved useful in every day practice. Here is your opportunity to exchange service pointers with the other fellow and earn $5.00 for the information. Write up your idea today and mail it to the *Service Pointer Editor*.

HOW TO CURE THE GRUNOW

Editor: You ask for down to earth practical kind of information from the practical men who have tried it.

Well here is one for the poor fellows and their questions in regards to repairing the Grunow Refrigerator. My method has never failed yet and I have never had a call back.

Remove the coil and condensing unit carefully, then drop it out the back window, go to the nearest tin knocker and have a pan made large enough to hold a 50-lb. piece of ice, set on four legs, solder in a piece of old tubing, set in a pail and go on your way without a care in the world.

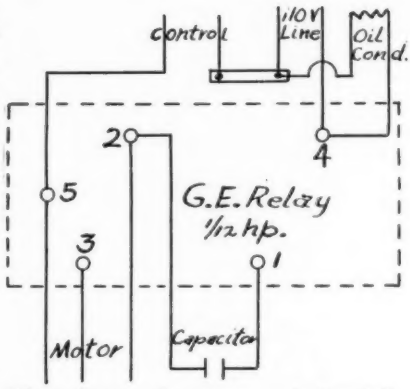
Well all joking aside I enjoy the little engineer very much and get much more than two dollars worth of information out of it so here's my two bucks and another two for Drak's Refrigeration Service Manual. Very truly yours, *J. C. Hanson.*

S S S

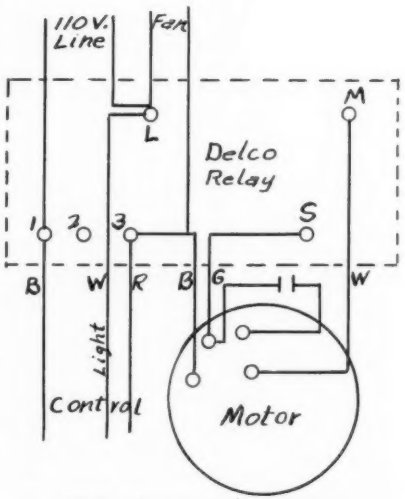
REPLACEMENT OF G. E. CONTROL WIRING GIBSON UNIT

FINDING it impossible to secure a control for G. E. monitor unit DR2 and others, without a delay of about 6 weeks, I did the following for a temporary job.

Use any G. E. or hot wire switch and overload relay of the correct hp. rating (in this case 1/12 hp.) one capacitor 110 V, 116 to 140 mfd., one Ranco control KW411 or equal and two or three conductor cords. Wire as shown.



Wiring diagram of temporary control for G.E. units.



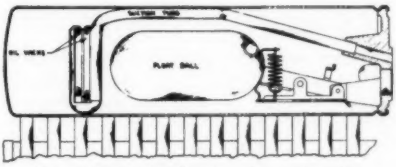
Wiring diagram for Gibson unit.

Fasten it all down where original control was located. Cover with box, if desired, and job works OK.

Sometime ago a Gibson domestic P-835 refrigerator (semi-hermetic H-5 unit) was brought into the shop for repairs. The unit had to be replaced (starting winding shorted to ground) and someone had previously removed all the wiring. Not having any data on this unit, I hooked it up as shown in the accompanying sketch.—*Submitted by Herbert Kraft, New Braunfels, Texas.*

REPAIRING MODEL P1117 NORGE EVAPORATORS

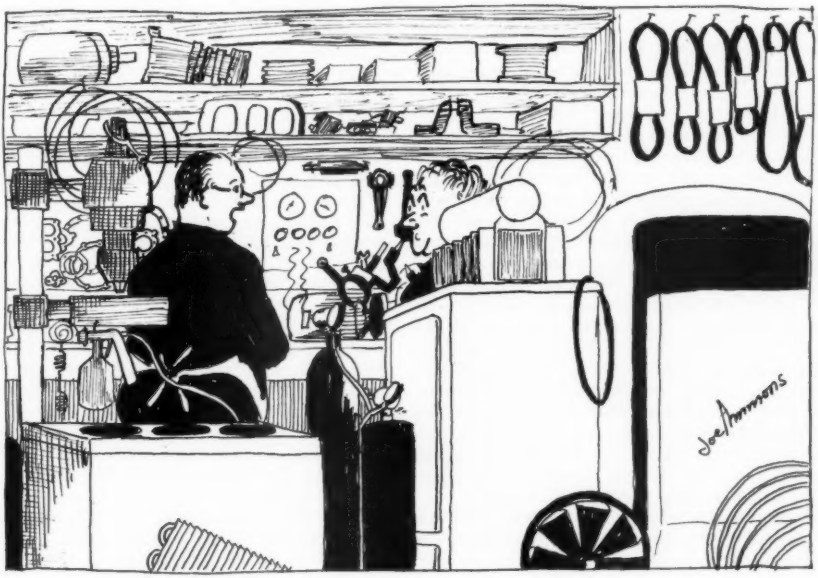
HERE is a hint on repairing Norge evaporators, using the double unit, in the refrigerator. I think the model is P1117. Anyway, the customer said to come over and set it up. I installed the coil inside the cabinet, using new hangar bolts and also used new suction line. The left coil would not frost but the right coil would frost. I pumped the job down, tested the float needles and found all were O.K., but the left coil still would not frost. This time I removed the left coil and took a hack saw and sawed four small gaps in the top edge of the header to permit removal of the float assembly. I heated well, dug out all the solder and then bent the three brass sections from the top unit, heated well and removed the front. The trouble was that the spring on the float arm had rusted so that the float would not operate. I replaced the spring



Norge Float showing location of spring.

and resoldered, checked for leaks and the job now works well. You must do a good solder job and use hard solder. The spring inside acts as the shock absorber and counterbalance. You can cut the oil return pipe off three inches from the front if you can't get the float back. The needle must hold perfectly before soldering. Install needle and test.—*Submitted by Julian M. Gantt, Montgomery, Ala.*

I'm thinking of expanding a little next year.



QUESTIONS AND ANSWERS

On Problems of Servicing, Installation and Maintenance of Household and Commercial Refrigerating Equipment—Send Your Problems to the Question Box.

COMMENTS ON QUESTION 721

THIS is an answer to Question 721 December, 1945, issue. I am not trying to answer the question in mind, but to relate a similar experience. An answer to my experience. To make this brief, I had all the symptoms related in question 721.

The solution—I had a receiver tank with the condenser discharge and the liquid line valve both in the same fitting, and mounted on top of the vertical receiver. After some tests I discovered that the liquid valve had been closed too tightly and had cracked through the brass fitting—thus letting the condensed vapor pass straight through, causing the bubbles in the sight glass and also starving the coil of liquid.

I merely installed a liquid valve in the bottom of the tank and charged the machine. The machine has now been running several months and not a bit of trouble. *Submitted by Bonnie Wood.*

PLANS OF COMPENSATION

QUESTION 734: I have been reading your articles in the R. S. E. on "Refrigeration Service," and would like your advice on the best plan for employing service men. I have been in the service business for the past five years, but other than my sons I haven't employed any service men regularly but I am planning to expand my business and will need to employ one or more service men and I am wondering which is the fairest and most satisfactory plan, whether on the salary or commission basis and what percentage.

Also, one man who is an experienced service man and who was former head of the Service Department of the local Power Company would like to become associated with me in the Service Business without any investment of capital, that is, work out of my shop under the name of my business, furnish his own car, but with no investment in parts, etc. What plan would you suggest for financing such an arrangement?

ANSWER: There are various incentive plans used in compensating refrigeration service men, and no doubt they have a certain amount of merit, particularly in larger organizations employing ten, fifteen, or more service men. Personally, I favor a straight hourly rate, with an allowance perhaps for a car, and also perhaps with a very small commission on the sale of certain items by the service men. However, the latter, that is, the commission, can be dangerous, for it may cause the service man to sell material to the user that is not necessary, and which may damage the good will of the customer toward the employer.

Another method that has been used is to pay the service man, (although at a somewhat higher rate per hour) for the actual time spent, that is, he would not receive pay for "lost" time involved in getting his material ready of a morning, etc. This method tends to reduce lost time, which can be a very sizable item, amounting to as much as an hour or more a day.

If the man is using his own car, he should receive a fairly substantial compensation, I would say that under present conditions and considering that hauling tools and material around is rather damaging to a passenger automobile, that 6c per mile is not too much.

I would look with a good deal of suspicion on the plan suggested in your second paragraph. In effect, under the arrangement that you mention he would actually be working for you and have all the benefits of being in your employ, except that he would collect and pocket the take. I think this would be a grand arrangement for him, but not be a very good one for you. I would say that you would be better off to hire him outright than to enter into such an arrangement. In the first place, he is not actually working for you, and you do not have sufficient control of his activities and contacts with the customer, which, since he is operating under your name, you will more or less be responsible for, and if his relations with a customer were unfavorable it would react against your good name and prestige. I am afraid that you would find such arrangement unsatisfactory, and that there would be a good deal of friction developed.

If he is furnishing his car, but you are supplying all of the investment, including the shop and materials, you really should re-

ceive at least 15 percent from his gross take, in order to receive your fair share of the added cost imposed upon your overhead by his operations and I doubt if he would be willing to agree to that large a percentage.

CALCULATIONS FOR VEGETABLE STORAGE ROOM

QUESTION 735: Room 100'x70'x15'. Temperature desired 36° to 40° for vegetable cooling. Would like to know what size of "Freon" machine is needed for this particular job. Also what size blower coil needed.

I have a 36" exhaust and intake blower which I intended to use. We will recirculate the same air. This air is to be circulated every 90 seconds. What speed would I run this blower?

Would like to have calculations for 4" and 6" slab cork insulation.

ANSWER: When one sets out to calculate the heat load on a cooler and specify the equipment to be used, all details are necessary. For example; the type of floor and whether it is on the ground or has open space below is important information, temperature of the space above the cooler, and surrounding it, estimated service load, and the amount of heat from men and lights.

The total product weight to be stored and the type of products also is necessary. This must be known because each vegetable has a different heat of respiration.

For this example, let us consider the following: Cooler on the ground floor, attic space above, ten 100 watt lights burning for 8 hours, and the following produce:

Lbs.	Btu 24 hrs.
1000 Beans @ 2700	1350
1000 Carrots @ 1400	700
2000 Lettuce @ 7400	7400
1000 Celery @ 2600	1300
1000 Corn @ 3800	1900
2000 Peaches @ 2000	2000
4000 Cherries @ 6000	12000
2000 Sweet Potatoes @ 1400	1400
Total heat of respiration	28050

1000 Watts @ 3.4 Btu. per watt hr., 8 hrs.	Btu 27200
Service load per 8 hours	22170
Total service and lights	49370
Wall load (4" cork*) 5100 x .07 x 50	17850
Ceiling load 7000 x .07 x 90	44200
Floor load 7000 x .07 x 15	7350
Total leakage/hour	69400

$$\frac{27200 + 22170}{8} = 6140 \text{ Btu. per hour for service and lights.}$$

$$\frac{28050}{24} = 1700 \text{ Btu. per hour for heat of respiration.}$$

	Btu.
Total hourly refrigeration load is	6140
	1700
	69400
	77240

Machine capacity must be

$$\frac{77240 + (77240)}{(2)} = 115{,}860 \text{ Btu. per hour}$$

or 10 horsepower operating at 25° evaporator.

*Use .05 factor for 6" cork in place of .07 factor for 4" cork.

WHAT TO DO ABOUT NEOPRENE RINGS WHEN BAKING COMPRESSORS

QUESTION 736: Reading back copies of your magazine is the winter pastime here. I note on page 27 of September, 1941, issue, Mr. Busby states that any neoprene gaskets or washers such as used in some seals should be removed when baking as "neoprene deteriorates at temperatures above 150°." Does this hold true for DuPrene friction rings?

Would you advise changing the friction ring in this type seal after baking at 200°? One could hardly pull a vacuum on compressor body without seal friction ring.

Another question—specifications for the amount of oil in units is sometimes listed as fluid ounces. When rated in fluid ounces are they generally marked fluid? How much difference in measure would an ounce of 300 viscosity oil by weight be?

ANSWER: From the latest available information, the neoprene will withstand temperatures up to 180° without deterioration. Insofar as other synthetics are concerned, they all depend upon their composition and hence it is necessary to know exactly which one is under consideration when determining the maximum heat it will withstand.

It is quite true a vacuum cannot be pulled on the compressor without the seal, therefore, your suggestion of replacing the synthetic ring is probably the best method.

When we speak of fluid ounces for any liquid, it is understood the volume is based on fluid measurements and not on the weight. If an oil with a specific gravity of .87 is under consideration, this means that .87 ounces would equal one ounce of mass. Stated differently, 14.49 ounces of oil would be equal to one pint.

CONVERTING FROM ICE

QUESTION 737: I have an icebox in my summer bungalow in which I would like to install a refrigerating unit. The box is well insulated (cork) and has porcelain walls inside and outside of the box. The three doors are gasketed and fit tight. The inside of the box is divided in half vertically by a partition which is open at top and bottom sufficiently to allow for free circulation of air to all parts of the box.

It appears to me that the box was built with the idea that it could be converted to a mechanical refrigerator, as there seems to be places for hanging an evaporator, etc.

My problems are these. What capacity condensing unit? What type best suited? The conditions under which it will operate are these. It must be able to cool off the box under a normal load for any domestic refrigerator of approximately 7 or 8 cubic feet of cooling space. The high side of the unit (motor, compressor, etc.) will have to be installed in the basement about 8 to 10 feet directly below the box. (If necessary this distance can be made less by building a shelf closer to the ceiling of the basement).

The bungalow is only used during summer months, so that the unit would have to be pumped down during the winter. In view of this condition do you think that this could be done without encountering trouble with the system when re-opening it in the spring every year? The name of the above mentioned ice box is "Leonard Cleanable."

ANSWER: From the description you have given of the ice box, I believe that it would work very satisfactorily when converted to mechanical refrigeration.

It is my suggestion that you consider a ¼ hp. unit to give you the needed capacity for rapid pull-down.

Under the operating conditions you outline, I would suggest further you use a semihermetic to eliminate the necessity of pumping down the system at the end of each season.

I do not believe you will encounter difficulty anywhere within 20 feet of the refrigerator, hence we suggest that the unit can be installed in any convenient place in the basement.

FROSTING RETURN LINE

QUESTION 738: I have run into a bit of a problem and would appreciate any help you can suggest. The box is a McCray 6 cubic ft. General Electric Condensing unit Type CM 325B, Model No. 19CM325B159D. It has 3 lb. of F-12, the coil is an expansion type with a thermostatic expansion valve with a Ranco thermostat. I service many of these domestics on board ships.

I find a good majority of the suction lines frosted on the on cycle, head pressure is OK, back pressure cut out about 8 lbs. The other day I had a frosted suction line with a short cycling. I suspected the expansion valve leaked so replaced same and also put a dryer in the liquid line. I replaced the exact valve, it being a "Detroit" non-adjustable, for "Freon" with 7° superheat and ½ ton capacity. When I started it up again it frosted almost half of the crankcase and the cycle seemed normal only I can't understand why it still freezes back. I believe if the valve was an adjustable type this condition may be overcome. The thermostatic expansion valve bulb and the thermo bulb are clamped together on the suction just before it leaves the box, on the top of the coil.

ANSWER: From your explanation, it would seem that the 7° superheat valve is too low a superheat setting to prevent the suction line from frosting There is a possibility that the capillary tube from the thermostat is transmitting heat to the bulb location in sufficient amounts to offset the total effect of the refrigerant vapor.

The proximity of the bulb to the exterior of the refrigerator may also reflect on the operation of the valve. A loop in the suction line to prevent heat transfer to the bulb may eliminate the trouble. It would also help if most of the capillary tube from the thermostat is inside the refrigerated area.

S S S

POSTWAR requirements for air conditioning are said to exceed $1,000,000,000 in volume. This estimate is based on the small percentages of homes and other buildings now air conditioned, some of which are: less than 1 per cent of homes valued at $12,000 or more with central heating units; only 3 per cent of department stores; 2 per cent of drug stores; 7 per cent of restaurants; 2 per cent of doctor's offices; 30 per cent of railroad cars, and similarly small figures for many other establishments.

REVERSE CYCLE REFRIGERATION

(Continued from page 33)

heat is extracted at the rate of 108,000 Btu. per hour. The chilled well water is discharged to the drain. The refrigerant in the chiller (A), evaporating at 50° F., is drawn to the compressor (B) where heat of compression is added to the heat absorbed in the chiller. The refrigerant gas is discharged from the compressor to the condenser (C) where it is liquefied, at 130° F., by surrendering heat to the water circulating between the condenser (C) and the coil (G). The water leaves the condenser (C) at the rate of 30 gpm. and at a temperature of 121° F., surrenders heat to the air in the coil (G) and is cooled to 112° F., at which temperature it returns to the condenser. Notice that only 108,000 Btu. are absorbed by the chiller (A), while 134,500 Btu. per hour are available at the water coil (G). The gain of 26,500 Btu. per hour is the heat of compression added by the compressor (B), for which electrical power is expended.

Heat Pump Is Not New

In the same manner that we have demonstrated, by a practical example, that the heat pump requires nothing new or different in the way of equipment, we can also show that there is nothing particularly new about the idea. Back in 1852, Lord Kelvin presented a paper, "On the Economy of Heating and Cooling of Buildings by Means of Currents of Air", before the Glasow Philosophical Society. In this paper, Kelvin outlined all of the features of the heat pump system and laid down the rules for its application.

Is seems reasonable to ask why, if the principles of the heat pump were known almost a hundred years ago, is the system not more popular? Only a handful of reverse cycle systems have ever been built. The answer lies in the cost of the system—both initial and operating. Unless conditions are extremely favorable, it cannot compete with conventional methods. While the heat pump will find some application, it does not appear that it will supplant other types of heating systems where loads are high and climates are a bit severe It may be physically possible to extract sufficient heat from a blizzard to heat your home, but the cost would be terrific.

However, power costs are coming down and the efficiency of refrigeration equipment is improving as its cost is reduced. These factors favors the heat pump. Where climatic conditions also favor its use, it should be given consideration. It is well to remember that, where a large amount of refrigeration equipment is essential to summer cooling, it may be practical to adapt this equipment to winter heating also.

CITY OF CHICAGO CODE

(Continued from page 29)

Because of this emergency, we respectfully request an opportunity to discuss this fully with you at the earliest possible moment.

We are joined in this request by several other associations, manufacturers, installers, engineers, and users of refrigeration equipment, who also feel that the regulation answers no useful purpose.

Respectfully submitted,
HEATING, PIPING & AIR CONDITIONING CONTRACTORS' CHICAGO ASSOCIATION

LOW TEMPERATURE REFRIGERATION

(Continued from page 36)

tor, which results in a temperature at the bottom of the evaporator coil of minus 56.5 deg. F. At minus 80 deg. F. under like conditions, the temperature corresponding to the pressure at the bottom is minus 73 deg. F. or a loss of 7 deg. in temperature at that point. Of course this effect depends upon the design of the system. If an accumulator is employed, the liquid ammonia at the bottom of the coil, in the case of the first example, is minus 60 deg. F. so that it is in a sub-cooled condition. Under such conditions it means that in the design of the evaporator this temperature difference must be taken into consideration. At 20 deg. F. the temperature difference in the above example would be less than 1 deg. F. Frequently, in low temperature installations, recirculation of the refrigerant is employed in the low side or evaporator in conjunction with an accumulator, the optimum location of which is beneath the evaporator coil. The amount in circulation can be anything from slightly more than sufficient refrigerant to develop the duty to as much as four or five times the quantity evaporated. We find that often a circulation of approximately two times the quantity is satisfactory; however, in most cases we prefer to use a larger amount, upwards to five times the quantity. The surge tank or accumulator from which the refrigerant pump takes its suction has

the refrigerant supply usually controlled by float level valves.

For really low-temperature installations it is best to cool the jackets of the low-stage compressors by water or by refrigeration connected to one of the higher stages. At low pressure the poundage of gas handled is quite small, so that the heat entering the gas from the pipe line, or from conduction as it enters the compressor, may be quite high in proportion. We have made it a practice to provide for refrigerated jackets on practically all compressors operating below minus 40 deg. F. (saturated refrigerant suction temperature).

In this kind of work various fluids have to be cooled in the form of brines, or for low-temperature process work. We refer particularly to calcium chloride, ethylene glycol, and methanol. Cooling these materials to the lowest temperature levels at which they may be successfully handled necessitates a careful consideration of the viscosity of the fluid within the cooling range. For example, a 20% calcium chloride solution operating at a temperature level of around 10 deg., if cooled to a range somewhere in the neighborhood of minus 40 deg. has a decrease in transfer value of about 40%. The power required for pumping brines at extreme low temperatures must also be carefully watched.

We might point out here that the pressure drop in pipe lines, on well designed low-temperature systems, is low. For example, with Freon-22 at minus 100 deg. F., the drop in pressure measured between the suction line and the intake port within a certain compressor showed a loss of only 0.06 lb.

(To be Continued)

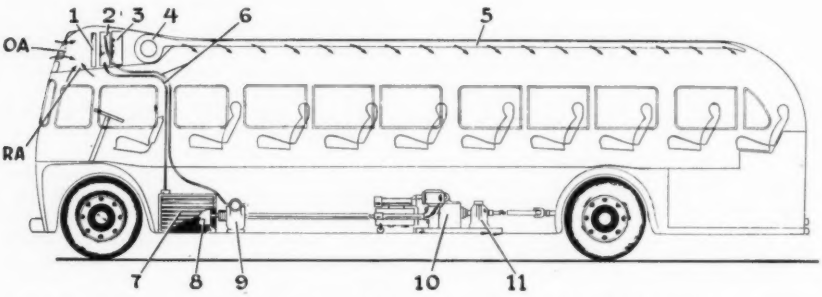
AIR CONDITIONED BUS MEETS WITH PUBLIC APPROVAL

THE world's first air conditioned city bus built by ACF-Brill and unveiled in December in San Antonio, Texas, has met with such approval from Lone Star State passengers that a new trend in urban bus refinements may sweep the nation, engineers believe.

Although Carrier Corporation here has equipped railway cars and cross-country busses with air conditioning for a number of years, the San Antonio experiment is the first in which a gasoline driven city bus has been fitted with cooling devices for the comfort of passengers. The San Antonio Transit Company has ordered 50 more air conditioned busses for delivery early this summer.

To keep the interior comfortable, filtered, cool, and dehumidified air is distributed evenly through the bus by means of a perforated duct in the ceiling. Outside air is drawn into the system to provide proper ventilation.

The new busses are equipped for maximum passenger comfort in heating and the newest design side seats are over the wheel houses. Aqua colored upholstery makes interiors as attractive as they are comfortable. Each bus seats 36 persons.



Details of air conditioned bus are revealed in cross sectional drawing, showing: (1) Air Filter; (2) Cooling coil; (3) Heating Coil; (4) Fan; (5) Air Distributor Duct and perforated ceiling; (6) Refrigerant piping; (7) Air-cooled condenser; (8) Fan for circulation of condenser air; (9) Refrigerator compressor; (10) Main bus engine which also drives refrigeration compressor; (11) Gear-shift transmission. OA is outside air and RA is recirculated air. Proportions of OA and RA as a mixture is varied by a damper.

YORK OPENS INSTITUTE OF REFRIGERATION AND AIR CONDITIONING

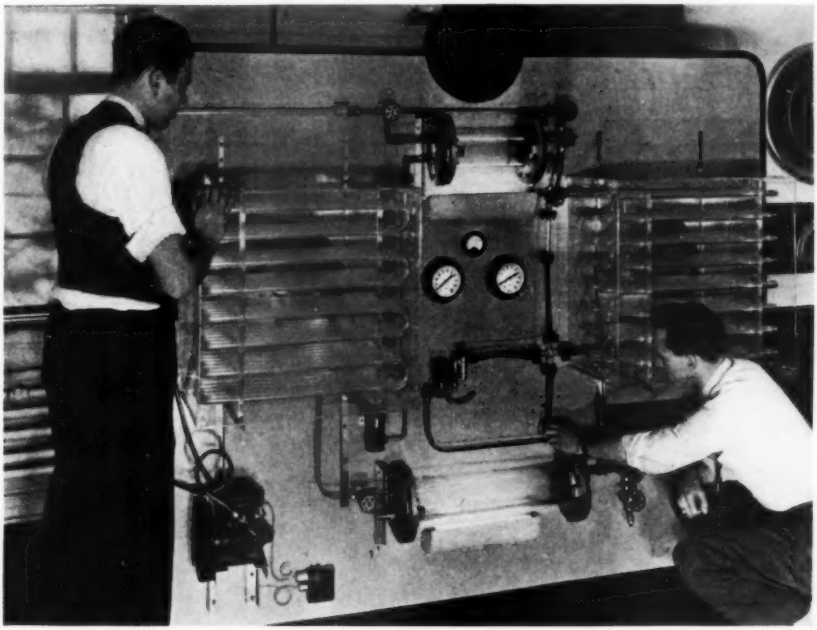
TO MEET the need of a thorough educational program in engineering, production, sales, service, and factory management for its employees and for its returning veterans, York Corporation formally opened Jan. 31, its Institute of Refrigeration and Air Conditioning. The only one of its kind in the industry, the school has a potential capacity of 1,000 students annually.

Designed to cover every phase of York's activities, the Institute will provide courses ranging in duration from a 5-year cooperative engineering course run in conjunction with Pennsylvania State College, to a two-week "refresher" course.

For the time being, two divisions of the Institute are being reserved exclusively for returning York veterans. These are the comprehensive apprentice training courses, covering 13 different trades, and the York-Penn State cooperative course, both of which are recognized by the Veterans Administration. Under the so-called "G. I. Bill of Rights," students will receive all or a portion of the funds needed to pay the educational expenses, depending upon the duration of the military service.

Stewart E. Lauer, president of York, declared that only through intensive and continuing study, can those in the rapidly expanding refrigeration and air conditioning field hope to pass on to the public the benefits of the newest advances in design, manufacture and service. At the Institute, he continued, students will be paid to attend while they learn everything about the specialized field of mechanical cooling, in which York has been a leader since 1885.

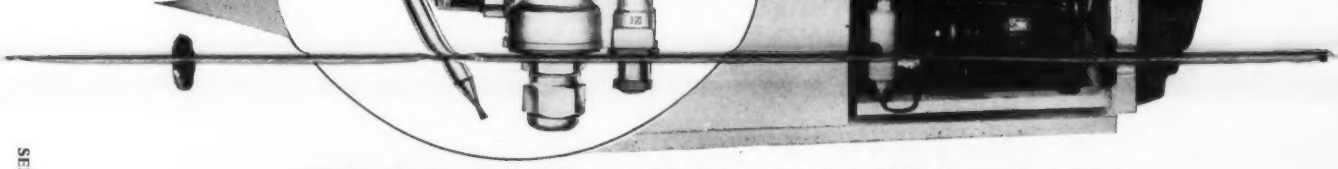
From foundry to machine shops, from laboratory to actual installations, he stated, men will learn about air conditioning and refrigeration under advantages not duplicated anywhere else. Under the supervision of



TRANSPARENT REFRIGERATION SYSTEM AT THE YORK INSTITUTE OF REFRIGERATION AND AIR CONDITIONING

This York-designed transparent refrigeration system traces compression refrigeration through its complete cycle. The student can actually see the transformation of gas to liquid and back to gas again as the refrigerant flows through the transparent evaporator and condenser.

SATISFACTION
FOR CUSTOMERS
AND SERVICEMEN—WITH
VALVES...
Herbert Frame
Service Manager
Public Service Co.
Baltimore, Maryland



Herbert Frame, Service Manager of the Public Service Co., of Baltimore, shown above, is checking the temperature of an ice-cream cabinet on test. A standard "A-P" Thermostatic Expansion Valve Model 207 is used on this job as standard equipment.

Writes Mr. Frame: "A-P Valves for high and low temperature work have been used by our company since 1936. Customers' satisfaction as well as servicemen's satisfaction has been accomplished by the use of A.P. Valves during this period."

There is more profit for servicemen and customers alike — with standard A-P Thermostatic Expansion Valves that can be used on low temperature, commercial temperature, and air conditioning work without adjustment.

You have less stock to carry, and your customers get better service—the kind that keeps them your customers year in and year out.

Bulletins covering all "A-P" Refrigeration Controls will be sent you upon request.

AUTOMATIC PRODUCTS COMPANY
2454 N. 32nd Street, Milwaukee 10, Wis.
Export Dept. 13 E. 40th St., New York 16, N. Y.

DEPENDABLE *Refrigerant Valves*

Stocked and Sold by Good Refrigeration Jobbers Everywhere • Recommended and Installed by Leading Refrigeration Service Engineers

the world's largest manufacturer of refrigeration and air conditioning equipment, they will be thoroughly schooled in practice as well as in theory.

The York-Penn State Cooperative Engineering Course, instituted in 1937, was discontinued during the war, and is now functioning again. This course leads to mechanical and industrial engineering degrees, after which the men become full-time employees of York.

Under the sales training program, the Institute will offer intensive selling courses, including an application engineering course of six weeks, sales engineering, and training for zone sales engineers who service York's distributors.

The service training phase, consisting of about six weeks of study, was established to meet the large scale immediate and early postwar needs of York's field organization for trained installation, maintenance, and repair men. As York's district offices expand, and distributors are added, more and more trained people will be needed to staff these outlets with factory-educated people.

Reflecting the tremendous need during wartime for training men newly graduated to supervisory positions, York has included in the Institute's program a course on "factory management" training This is to show men how to meet the increased responsibilities of new positions, and to bring about a uniformity of understanding and functioning throughout the organization.

PAY RISE IS NOT BASIS FOR CEILING INCREASE

SMALL repair shops for appliances, motor vehicles and farm equipment cannot automatically increase their ceiling prices on account of wage increases granted their employes. This action, effective February 9, 1946, synchronizes OPA price ceiling provisions for these shops with the Government's wage-price policy established in August 1945.

Since 1943 and until last August these shops, with not more than eight employees, have had authority to increase their ceiling prices to compensate for wage increases to employes. A report of such action merely had to be filed with the local price board.

Since August 1945 wage increases could not be considered as a basis for increasing price ceilings for these repair shops. The present action merely brings the price ceiling provisions in line with this change.

(Amendment 3 to Supplementary Service Regulation 6 to Maximum Price Regulation 165 and Amendment 3 to Supplementary Service Regulation 22 to Maximum Price Regulation 165—both effective February 9, 1946.)

NEBRASKA FIRMS APPROVED FOR ON JOB G.I. TRAINING

TWENTY-ONE Nebraska firms which manufacture ice and refrigerating equipment, or which deal in such commodities or equipment, have been approved for "on the job" training of ex-servicemen under the G.I. bill of rights, it was reported by the office of the Nebraska state superintendent of schools. This is the Nebraska agency which has charge of approval or disapproval of applications of business establishments for training of veterans.

The Nebraska firms which are now training veterans on the job, include the Gordon Lozier Co., Omaha, two refrigeration servicemen and two cabinet makers; Natkin & Co., Omaha, three air conditioning and refrigeration servicemen; Omaha Cold Storage Co., two accountants and two cost-manufacturing accountants; Omaha Fixture & Supply Co., six commercial refrigeration display case manufacturers; Orchard & Wilhelm, Omaha, one refrigeration mechanic; York Corporation, Omaha, one draftsman; W & W Ice Co., Scottsbluff, three artificial ice manufacturers; Chadron Gas Co., Chadron, one air conditioning mechanic; George Ewert Co., Columbus, one refrigeration serviceman; Gamble Stores, Fairbury, three refrigeration mechanics; Harris Radio & Electric Co., Fairbury, three refrigeration mechanics; Stull Electric Service Co., Fairbury, one refrigeration serviceman; Druliner Electrical Works, Fairbury, four refrigeration mechanics; Capital Store Fixture Co., Lincoln, two refrigeration mechanics; Hester Service Co., Lincoln, three refrigeration servicemen; Lowe Hardware Co., Mullen, one refrigeration service man; Electric Fixture and Supply Co., Omaha, five refrigeration mechanics; Hastings Air Conditioning Co., Hastings, ten air conditioning appliance manufacturers and one purchasing agent; Frigid Service Co., Lincoln, two refrigerator service men; Major Appliance Co., Omaha, two refrigeration service men and two air conditioning service men.

REFRIGERATION FOR PHOTOGS.

THE photographer's hot weather problem of keeping his developing solution at a safe, even temperature has been solved by the development during the war of mechanically refrigerated temperature control systems.

The new temperature control units for the processing of photographic negatives and prints were designed by the refrigeration industry at the request of the Army and Navy to meet the varying climatic conditions of global war.

According to reports to the Refrigeration Equipment Manufacturers Association, the units are readily adaptable to the needs of civilian photographers, both commercial and amateur, and are particularly efficient in the processing of color photographs which require accurate temperature control.

Many of the different units produced during the war required refrigeration and heating to maintain temperature control when subjected to seasonal climatic changes. Other units, designed for use only in the tropics, contained only refrigeration units.

For dark rooms aboard ships and for use in mobile trailers, the refrigeration industry developed a compact, self contained refrigeration system to maintain a constant temperature in developing and fixing solutions regardless of room and outside temperatures.

An exterior and interior view of the new quarters of Refrigeration Supplies Distributor, Los Angeles, Calif., utilizing island display and self service arrangement of parts.
"We have been making this change for the past year," states Ira A. Hammer, Assistant Manager of the Company, "and we believe it is a great advantage to the service man and to us. The service man has been more than satisfied by being able to see the merchandise and sales have jumped accordingly."

Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

COMING CONVENTIONS

RSES Convention

Place: Hollenden Hotel.
City: Cleveland, Ohio.
Date: October 26, 27, 28, 29, 1946.
Secretary: H. T. McDermott, 433 N. Waller Ave., Chicago 44, Ill.

All Industry Exhibition:

Place: Cleveland Public Auditorium.
City: Cleveland, Ohio.
Date: October 28-29-30-31, 1946.
Exec. Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pa.

Wisconsin State Assn.

Place: The Park Hotel.
City: Madison, Wis.
Date: March 16 and 17.
Secretary: A. L. Robertson, 409 Walton Place, Madison, Wis.

Interprovincial Assn.

Place: King Edward Hotel.
City: Toronto, Ontario, Canada.
Date: March 17 and 18.
Secretary: E. G. McCracken, c/o Laird and Vanderhoof, Leaside, Ontario, Canada.

California State Assn.

Place: Hotel Fresno.
City: Fresno, Calif.
Date: May 11-12.
Secretary: Gerald S. Kennedy, P. O. Box 921, Sacramento, Calif.

S S S

Mr. E. F. Cassing
Boonville, Missouri

Needless to say I appreciate very much THE REFRIGERATION SERVICE ENGINEER. However, it should either be twice its original size or on a bi-monthly basis.

GREENSBURG CHAPTER RECEIVES CHARTER

THE Greensburg Chapter of the Refrigeration Service Engineers Society observed charter night at a dinner meeting held in the Crystal Room of the Penn Albert Hotel on February 7. The charter was presented to the chapter by Clarence Buschkopf of Beaver Dam, Wis., acting president of the International Society. The meeting was attended by 62 members and their guests.

Among the speakers were Mayor Henry S. Coshey and Secretary O. M. Deibler of the Greensburg Civic and Business Association. Following the dinner and business meeting cards and dancing were enjoyed. Prizes were awarded.

The newly formed Chapter will comprise an area within 50 miles of Greensburg. Guests present were from Pittsburgh, Altoona, Uniontown and intervening points. Meetings will be held monthly.

Officers of the local Chapter are: J. P. Curry, *President;* J. W. Michaelson, *Vice-President;* Ted Eisaman, *Second Vice-President;* B. M. Allen, *Treasurer;* Joseph C. Hipps, *Secretary;* and Ralph Wesling, *Sergeant-At-Arms.* Emerson Eisaman, D. Robert Miller and Don Fisher are directors.

S S S

TAMPA FLORIDA MEN APPLY FOR CHARTER

A NEW Chapter, to be known as the Florida West Coast Chapter of the Refrigeration Service Engineers Society, is being formed at Tampa, Florida. Petition for a charter was signed by a group of men and approved February 25. Arrangements are now being made for Charter presentation in the near future by an officer of the International group.

Refrigeration Educational Sound Films
Schedule of Showings

UNDER the supervision of P. B. Reed, International Educational Director, a set of 16 sound films, grouped into 12 showings and accompanied by a set of slides, are being circulated among chapters as a part of their educational program. Films are all of a practical nature on servicing refrigerating systems. Titles of the films and their identifying numbers and the schedule of showings are listed.

Film Titles and Key Numbers

No.	TITLE
360	Principles of Refrigeration
438	Checking The System—Part I
439	Checking The System—Part II
440	Locating and Repairing Leaks
441	Adding or Removing Refrigerant
442	Removing and Installing A Compressor or Condenser
443	Removing and Installing A Cooling Unit
444	Adjusting and Checking The Expansion Valve
445	Checking and Replacing A Float Valve
446	Checking The Electrical System
447	Quieting A Noisy Refrigerator
448	Adjusting and Repairing The Thermo-Expansion Valve
451	Servicing Water Cooled Condensers
449	Adjusting Pressure Actuated Temperature Controls
450	Adjusting Commercial Thermostatic Controls
452	Making and Repairing Tubing Connections

Schedule of Showings

AKRON, OHIO—Akron Chapter: April 10—No. 360. Contact F. J. Roller, 357 S. Maple St., Akron 3, Ohio.

AURORA-ELGIN-JOLIET, ILL. — Tri-County Chapter: April 20—No. 360. Contact B. V. Clark, 612 N. May St., Aurora, Ill.

BATON ROUGE, LA.—Louisiana Chapter: April 5—No. 360. Contact E. A. Summer, 3867 N. 33d St., Baton Rouge 5, La.

CHICAGO, ILL.—Chicago Chapter: April 9—No. 438-439. Contact D. D. Orr, 332 S. Hoyne Ave., Chicago, Ill.

COLUMBUS, OHIO—Columbus Chapter: April 10—No. 438-439. Contact H. Grossman, 22 W. Naghten St., Columbus, Ohio.

DAVENPORT, IOWA — Mississippi Valley Chapter: April 2—No. 440-441. Contact J. Vinje, 529 W. Second St., Davenport, Iowa.

DAYTON, OHIO—Dayton Chapter: April 11—No. 440-441. Contact R. E. Warner, 359 W. Monument Ave., Dayton, Ohio.

DENVER, COLO.—Mile High Chapter: March 18—No. 360. April 15—No. 438-439. Contact R. C. Kimmel, 1524 15th St., Denver 17, Colo.

DUBUQUE, IOWA—Key City Chapter: April 3—No. 438-439. Contact R. E. Mueller, Stampfer Farm & Home Store, 7th & Iowa, Dubuque, Iowa.

GRAND RAPIDS, MICH. — Furniture City Chapter: April 2—No. 438-439. Contact M. D. Thiebout, % Consumers Power Co., 450 Market, S. W., Grand Rapids, Mich.

HUNTINGTON, W. VA.—Tri-State Chapter: April 9—No. 360. Contact A. W. Albertsen, 314 Eleventh St., Huntington 14, W. Va.

KANSAS CITY, MO.—Kansas City Chapter: April 3—No. 440-441. Contact C. R. Visger, 7715 Brooklyn, Kansas City, Mo.

LANSING, MICH.—Wolverine Chapter: March 25—No. 438-439. April 22—No. 440-441. Contact R. Kellogg, 616 Jessop Ave., Lansing, Mich.

LOUISVILLE, KY.—Colonels Chapter: March 21—No. 438-439. April 18—No. 440-441. Contact J. M. Berry, % F. H. Langsenkamp Co., 339 W. Main St., Louisville 2, Ky.

MADISON, WIS.—Madison Chapter: April 11—No. 440-441. Contact Refrigeration Maintenance Corp., 731 University Ave., Madison 5, Wis.

MONTGOMERY, ALA.—Montgomery Chapter: April 15—No. 360. Contact W. C. Goodwin, 8 Forest Ave., Montgomery, Ala.

OMAHA, NEB. — Missouri Valley Chapter: March 21—No. 360. April 18—No. 438-439. Contact C. M. Flohr, % United Motors Service, 27th Ave. and Harney St., Omaha, Neb.

ROCKFORD, ILL.—Rockford Chapter: March 18—No. 438-439. April 15—No. 440-441. Contact L. L. Sturch, 1915 Vernon St., Rockford, Ill.

SALT LAKE CITY, UTAH—Beehive Chapter: March 28—No. 360. April 25—No. 438-439. Contact W. W. Walker, % G. E. Supply Corp., 310 W. 2nd South St., Salt Lake City, Utah.

TULSA, OKLA.—Oil Capital Chapter: March 27—No. 438-439. April 24—No. 440-441. Contact R. W. Palmer, 820 E. 3d St., Tulsa 3, Okla.

WATERLOO, IOWA—Cedar Valley Chapter: March 27—No. 360. April 24—No. 438-439. Contact J. Adams, % Herbert Refrigeration, 719 Lafayette St., Waterloo, Iowa.

California RSES Association Formed

SEVEN CHAPTERS — 600 MEMBERS ORGANIZE STATE GROUP AT FRESNO

IN A MEETING, unprecedented in enthusiasm and unity of purpose displayed, seven RSES chapters and numerous members at large within the State of California have formed a State Association to be known as the California Association of Refrigeration Service Engineers Society.

The meeting was a two-day session held in the Hotel Fresno, at Fresno, Calif., Feb. 2-3. W. W. Allison was elected President of the Association. Other officers elected are: Rowland F. Cooke, San Francisco, *First Vice-president;* A. H. Brundage, Fresno, *Second Vice-president;* Gerald S. Kennedy, Sacramento, *Secretary;* Lloyd Thomas, Monterey, *Assistant Secretary;* M. R. Hanks, San Diego, *Treasurer;* W. C. Irving, Los Angeles, *Educational Director;* Everett Brown, Long Beach, *Sergeant-At-Arms.*

The Association begins with 600 members. The next meeting is scheduled for May 11-12 and every four month thereafter.

Saturday—February 2

W. W. Allison, International Director, called the meeting to order for the purpose of organizing a California Association of the Refrigeration Service Engineers Society. Two delegates sent from each chapter in California were present. Mr. Allison introduced each delegate: A. H. Brundage and John Geringer, Fresno; J. Pat Riley and Everett Brown, Long Beach; J. C. Rodgers and W. C. Irving, Los Angeles; Lloyd Thomas and Norman Overweser, Monterey; Gerald S. Kennedy and Richard M. Oeberst, Sacramento; M. R. Hanks and Ralph French, San Diego; Rowland F. Cooke and Larry E. Jensen, San Francisco.

Members at large introduced were: Leonard N. Fox, Chico; Dewey L. Stines, Modesto; Bill Imfeld, Modesto; Roy Shannon, Bakersfield; Ken C. Moore, Van Nuys; Wayne K. Ross, Redding; M. A. Soder, Anaheim; and W. E. Brown, Tracy. Nine visitors present were also introduced.

It was moved and carried that W. W. Allison be elected to serve not only as the Chairman Pro Tem for the meeting, but also as the regular elected President of the California Association of the Refrigeration Service Engineers Society.

It was moved and carried that James C. Rodgers be elected as the Secretary Pro Tem.

W. C. Irving presented a lucite gavel to Mr. Allison, and made a motion which was carried that the permant officers who were to be elected should provide a suitably engraved band for the gavel, which gavel would become the property of Mr. Allison at the end of his term of office as President of the California Association.

Chairman Allison made a statement of the purposes and objectives in forming a California Association of the RSES, and appointed the following delegates to serve as a committee to nominate regular officers: A. H. Brundage, Fresno; Rowland F. Cooke, San Francisco; Ralph French, San Diego; William C. Irving, Los Angeles; Gerald S. Kennedy, Sacramento; J. Pat Riley, Long Beach; Lloyd Thomas, Monterey.

Resolutions

It was moved and carried that the following resolution be adopted:

Whereas, we consider that there is a need for a State Association of the Refrigeration Service Engineers Society in California, therefore be it resolved that an Association be here and now formed to be known as the California Association of Refrigeration Service Engineers Society.

BE IT FURTHER RESOLVED that this Association shall be composed of members of chapters in California, members at large in California, members of chapters in other states but whose residence is in California.

BE IT FURTHER RESOLVED that the delegates here assembled proceed to elect officers to serve to June 30, 1947.

BE IT FURTHER RESOLVED that when these officers have been regularly and duly elected and qualified they will immediately be installed and obligated and thereupon take over the conduct of this meeting and the administration of the business of this Association.

BE IT FURTHER RESOLVED that said officers will as first order of business cause to be formulated a constitution and by-laws and that said constitution must and will in all respects conform to that of the International Society of Refrigeration Service Engineers.

BE IT FURTHER RESOLVED that it is the consensus of the various chapters in California that the interests of the Refrigeration Service Engineers Society can be further advanced by the formation of a State Association and the following duly appointed delegates of the following chapters hereby request that a charter be issued to the California State Association of Refrigeration Service Engineers Society. *(Signed by chapter delegates.)*

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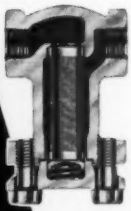

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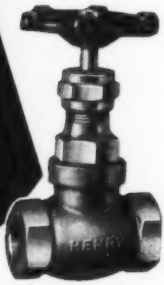
For compressor crank cases and liquid storage tanks. Slotted gauge glass guards. Ball check valve in inlets automatically shuts off flow if the glass should break.



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Accurate release and positive reseating action. Soft alloy metal seat and extended stem permit emergency reseating without removing valve from line. Sizes ⅜" to 2" inclusive.

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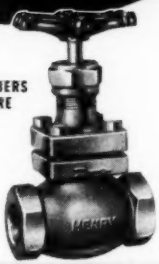

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The meeting recessed to permit the nominating committee to retire to prepare its nominations. During the recess there was a general discussion by the remaining delegates, members at large, and visiting members.

The meeting reconvened and received the report of the nominating committee from W. C. Irving, Chairman, nominating the following for the offices shown: W. W. Allison, *President;* Rowland F. Cooke, *First Vice-president;* A. H. Brundage, *Second Vice-president;* Gerald S. Kennedy, *Secretary;* Lloyd Thomas, *Assistant Secretary;* M. R. Hanks, *Treasurer;* W. C. Irving, *Educational Director;* and Everett Brown, *Sergeant-At-Arms.* Board of Directors—Ralph L. French, John Geringer, Larry E. Jensen, Richard M. Oeberst, Norman Overweser, J. Pat Riley and James C. Rodgers.

The committee reported that in not nominating a member at large for a state office, it wished to go on record as recommending that such members at large be invited to affiliate with the chapter nearest them and thus secure representation through the chapters.

Following a motion made and carried that the nominations be closed, a motion was made and carried that the secretary record the ballot of the nominated and elected members to take office, and to be installed as the officers of the California Association of Refrigeration Service Engineers Society.

Committees Appointed

President Allison appointed the following committees. The Constitution and By-Laws Committee: James C. Rodgers, Chairman; J. Pat Riley and Ralph French. The Legislative Committee: Rowland F. Cooke, Chairman; A. H. Brundage and Everett Brown.

It was moved, and carried that the next regular meeting of the California State Association of Refrigeration Service Engineers Society be held in Fresno, California.

It was moved and carried that the California State Association of Refrigeration Service Engineers hold three regular meetings each year, to be on the first Saturday and Sunday of January, May, and September, except when such days include a national holiday. For 1946 those dates would be May 4 and 5, and September 7 and 8.

The Chairman appointed the following as an Educational Committee to serve with W. C. Irving, Educational Director: Olin C. Yates, Pacific Scientific, 25 Stillman St., San Francisco, Calif., and Lawrence Roth, Refrigeration Service, Inc., 3109 Beverly Blvd., Los Angeles.

At the conclusion of a discussion among all present on the subject of the amount of money which would be required to carry on the program of the Association, and possible methods of obtaining support for the State Association, it was moved and carried that the Chairman appoint a Budget Committee. The Chairman appointed the following: Richard Oeberst, Lloyd Thomas and M. R. Hanks. The Budget Committee retired to prepare a tentative budget, and the general meeting recessed from about 3:35 to 3:45 P.M.

The question of the appointment of a Ways and Means Committee was discussed, but it was moved and carried that the Budget Committee already appointed be retained as such, but be designated as the Budget and Finance Committee and serve in the combined capacity of a budget and a ways and means committee.

The Chairman inquired whether the Association desired to have a committee on standards, but after discussion no action was taken.

There was a discussion of the possible need for a membership committee in the State Association, or a publicity committee. It was decided that each director would serve in the capacity of a membership committee. The Chairman stated that in order that chapters may contact members at large, the chapter secretaries will receive from him lists of members at large who reside in the vicinity of each chapter.

M. R. Hanks, Chairman of the Budget Committee, presented the committee report estimating that $2500 would be required to carry on the program for the first year as planned by the California Association of Refrigeration Service Engineers Society, and suggested that based on an estimated statewide membership of 600, a yearly per capita assessment of $4.50 would be required from each RSES member and each member at large. A breakdown of the $2500 total was given. After the Chairman informed the Budget Committee that in its absence the committee title had been changed to the Budget and Finance Committee, Mr. Hanks asked for a discussion on the floor concerning the suggested amount of $4.50 a year, and methods of collecting the California Association dues, and asked that the Budget and Finance Committee be allowed to meet in the evening and make its report the following day. It was the consensus of opinion of the members at large who were present that the amount of $4.50 was satisfactory.

It was moved and carried that the fiscal year for the California Association of Refrigeration Service Engineers Society be set from July 1st to the following June 30th.

Sunday—February 3

The Secretary was instructed to record a vote of thanks extended to Mrs. Dorothy Kennedy for assistance in the preparation of the minutes.

It was moved and carried, in view of an apparent agreement that the State Association should have a publicity committee, that the President be empowered to appoint a publicity committee following an investigation of qualified candidates, such appointees to be notified either by mail or verbally.

Mr. G. C. Armour was appointed by the President as Chairman of the Entertainment Committee, and the suggestion was made that as an assistance to the chairman, each four months a sub-chairman should be appointed who resides in the vicinity where the next meeting will be held.

After discussion among the delegates present, it was suggested to Mr. Armour that he investigate the possibility of securing reservations for as many as two hundred people for the meeting of May 4 and 5, 1946, to be held in Fresno, California.

It was moved and carried that the State Association have a convention committee, and

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The Serviceman Thermometer and all Marsh Gauges have the "Recalibrator"—quickest and best means ever developed to restore the accuracy of a thermometer or gauge that has been knocked out of adjustment.

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that the president be authorized to appoint the chairman of that committee at any time prior to the meeting to be held May 4 and 5, 1946.

In a discussion, it was agreed that in cooperation with the President of the State Association, members of the Board of Directors should render any assistance possible in the organization of new chapters.

It was moved and carried that the recommendations presented in a verbal report of the Budget and Finance Committee by M. R. Hanks, Chairman, be approved, namely: (a) That the State Association dues be $4.50 per capita for each fiscal year, July 1 to the following June 30. (b) That the State Association dues for the period between February 2, 1946, and June 30, 1946, be pro rated at $1.50 per capita. (c) That the State Association will not reimburse its officers for actual traveling expenses in excess of the following amounts: $4.00 a day for hotel; $4.00 a day for meals; and 5¢ a mile for transportation expense without regard to the means of transportation selected.

It was moved and carried that the President arrange for the designing and ordering of stationery for the State Association, and for membership cards.

The proposed constitution submitted by the Constitution and By-Laws Committee through James C. Rodgers, Chairman, was adopted as set forth.

SPRINGFIELD, MISSOURI, BEGINS ORGANIZATION

ON JANUARY 31 a meeting of refrigeration service men was held, at which Hussmann Refrigeration, Inc. gave a lecture on the subject of servicing equipment developed in the last four years. A guest at the meeting, Mr. Paul Shapiro, who is a member of the Society and a representative of the Superior Refrigeration Supply Company in Kansas City, explained the purpose of the Society and suggested that the members organize a chapter in Springfield. Consequently, a second meeting was held February 20 at the Harry Hoffman Supply Co., with 35 in attendance.

All those in attendance submitted applications for membership and signed the petition for charter. Temporary officers elected at this meeting were: Michael Cindric, *President;* Earl Denney, *First Vice-president;* Charles Champieux, *Second Vice-president;* M. L. Mercer, *Treasurer;* Wayne Moore, *Secretary;* Harry Hoffman, *Educational Committee;* and Glen Hendrix, *Sergeant-At-Arms.*

FAIRFIELD COUNTY CHAPTER CHARTER PRESENTATION

Eighty-five were in attendance at the Dinner meeting of the Fairfield County Chapter, held at the Fairway Restaurant, Bridgeport, Conn., and at which the Chapter Charter was presented. Acting International President, Clarence Buschkopf, administered the oath to 41 charter members during the meeting and presented Bernard Pactor, President of the chapter, with the charter. Thomas Glover was master of ceremonies for the evening and provided entertainment for the group. Two guest speakers, L. Wallace, past president, and A. Murphy, President, from the Elm City Chapter, New Haven, Conn., spoke on the advantages of a chapter in the community and membership therein. Numerous prizes were distributed during the evening and the entire affair proved enjoyable to those in attendance.

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That quickly restores to operation any HERMETIC FRIGIDAIRE, GIBSON, GRUNOW, NORGE, COLDSPOT, GENERAL ELECTRIC, AND OTHER UNITS REQUIRING EITHER SPLIT PHASE OR CAPACITOR STARTING CIRCUITS.

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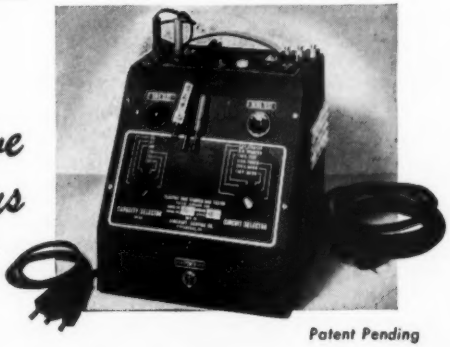

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6. Scientifically designed for easy operation.
7. Impressive looking and creates customer confidence.

Complete with power cord, test leads and complete detailed instructions.

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HEAD OF THE LAKES CHAPTER BEING FORMED

ON JANUARY 14 a group of refrigeration service men met at the Spalding Hotel in Duluth, Minn., for the purpose of discussing the possibility of establishing a chapter of the Refrigeration Service Engineers Society in the Duluth-Superior area.

The second meeting was held January 21 at the Hotel Spalding and although the weather was 15° below zero, a good attendance resulted and 17 members signed a petition for charter. This number has since been increased to 20 signatures.

Regular meetings have been scheduled for the future, to be held the first Monday of each month. Plans are now being made for the charter presentation which may be held at the April meeting.

The charter is being held open in the meantime for additional members who may wish their name to appear on it.

S S S

R.S.E.S. Chapter Notes

COW TOWN CHAPTER

Fort Worth, Tex., Feb. 14—The speaker of the evening was Mr. Payne of the Better Business Bureau, who explained to the attendance the duties of the Bureau and just how it could be helpful to the chapter. After Mr. Payne's discussion, the chapter voted to supply the Bureau with a list of all members in good standing and to keep them informed of all changes in the list. The chapter decided at this meeting to increase its local advertising and to investigate all possibilities for greater publicity through chapter activities. A committee consisting of Messrs. Ed Ketchum, Howard Lee and F. R. McGuire were appointed to carry on the work.

CORN BELT CHAPTER

Bloomington, Ill., Feb. 13—Some time was spent on business matters of the chapter, then President Woodard announced that Bob Saunders had something to say. Bob took the floor with the following surprising remarks, which produced a rather humorous half-hour of entertainment. Said Bob:

"Gentlemen: As you probably have noticed, we have a distinguished member with us tonight—distinguished principally because he has been absent from most of the R.S.E.S. meetings of late—especially the dinner meetings. I understand that it was through no fault of Carl's that he has been unable to attend the meetings. As you know, Carl is Service Engineer for the Eureka-Williams Company and spends much of his time traveling throughout the southern states servicing air-conditioning equipment. Now Carl

Corn Belt Chapter buys Carl Huth a dinner, had it served to him during the meeting while Bob Saunders stood by with a baseball bat to make him eat it.

PROMINENT ELECTRICAL MANUFACTURER

is interested in acquiring, through cash purchase or exchange of stock, established companies, such as:

1. **Commercial Refrigeration Manufacturer: Show Cases, Reach-Ins, Beverage Coolers, etc.**
2. **Water Cooler Manufacturer: Self Contained Water Coolers**
3. **Air Conditioning Manufacturer: Manufacturer of Self Contained Air Conditioning Machines**
4. **Commercial Frozen Food or Ice Cream Cabinet Manufacturer**

We are also interested in purchasing or acquiring the rights to manufacture a line of hermetically sealed compressors that have been completely engineered. Facilities available for manufacturing compressors.

Operating management retained. All inquiries strictly confidential. Communicate with us direct or through your attorney.

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has been quite troublesome of late. Upon his return from a trip down south he invariably hunts me up and proceeds to jump astraddle my neck. This I didn't mind but when he pokes his thumbs in my eyes I figure that is carrying it too far. As he puts it, we deliberately wait until he leaves town to put on a feed. To assure Carl that we of the Corn Belt Chapter have no such intentions, we are now presenting him with a complete dinner with all the trimmings and hope that he enjoys it as much as we have on past occasions." (At this point a waiter entered with dinner.) "And in case Carl should give us further trouble with an alibi that he is not hungry, I had a persuader sent along and shall see to it personally that he eats every crumb." (Waiter returned and presented him with a baseball bat.) It was at this point that the accompanying photo was taken.

M. V. Stagg introduced the speakers of the evening who were Messrs. John Becker and M. V. Stephens, Lubricating Engineers of the Sinclair Oil Company. Supplementing their talks were two very enjoyable and educational films.

MILE HIGH CHAPTER

Denver, Colo., Jan. 21—President Lyndle Barley announced that in the near future a Certificate Membership examination would be held and asked for a list of those who would take the examination. Twenty-eight members signed up during the evening. After some discussion it was decided that four additional Board of Director members should be elected by the chapter. Two of these members would serve 18 months and two 6 months. The two serving 6 months would be replaced at the annual election in June, and would then serve 2 years, and two additional members would be elected each year thereafter. It was felt that these members would act more or less as a liaison between the outgoing and incoming officers each year. Refreshments were served following the meeting.

Feb. 18—Definite arrangements were made for the certificate examination with the date set for March 22. More members signed up for this examination, making a total to date of 41. The meeting was then turned over to the chairman of the Educational Committee, Lyle Smith, who conducted the door prize drawing for the evening. E. Martin, Dick Houghton and Lyle Smith were the winners. T. E. Ericsson was the speaker of the evening, who explained the workings of the Electrolux refrigerator. For entertainment a series of hunting, fishing and scenery pictures were shown. Refreshments wound up the evening.

MISSISSIPPI VALLEY CHAPTER

Davenport, Ia., Feb. 5—The meeting was called to order by President E. J. Ford, and the roll call showed 24 members present. The annual election of officers was held with the following results: Ervin Meyer, *President;* John Zirkelback, *Vice-president;* James Vinje, *Secretary-Treasurer;* Ray Potter, *Sergeant-at-Arms.* The following men were elected as Board of Directors: Verne Duncan, Fred Tindall and Frank Weatherly. An invitation from Liquid Carbonic Company to hold a special meeting on Feb. 28 was accepted, and a committee was appointed to make arrangements for refreshments. The business meeting was then closed, and the first movie of the series, furnished through the national office, was shown. This film was very well received and all members voted to book the full program for the next eleven meetings.

TWIN CITIES CHAPTER

Minneapolis, Minn., Jan. 8—The newly elected officers of the chapter were installed in office at this meeting. The new officers are: Dean Holmes, *President;* George Gartner, *Secretary;* Milton Swanson, *Treasurer.* George Beardsley conducted a discussion of the methyl chloride poisoning of three persons in a Minneapolis apartment, in which reports stated death had been caused by a leak in the refrigeration system. There seemed to be some doubt in the minds of the attendance, after an explanation of the investigating committee, that the deaths could have been caused by a leak in the system. The only outlet for such a leak to the area where the persons met death, was a one inch hole through the floor between the second and third stories. Joe Propsy then gave a brief summary on the danger of a small concentration of methyl chloride, stating that exposure to this amount for a period of five days may bear results ten days later. Herbert Gartner suggested that an educational program on how to handle refrigerant gases might be appropriate at this time. Mr. Gartner stated that all refrigerant gases are dangerous and proper handling is an important part of every service man's knowledge.

MISSOURI VALLEY CHAPTER

Omaha, Nebr., Jan. 24—This was a dinner meeting at which the annual election of officers took place. After the dinner, nomina-

contents

Refrigeration KNOW-HOW

The new Kold-Hold Catalog is a book of benefits and savings. It contains refrigeration know-how . . . information relative to the better storage and transportation of perishable products at lower costs. This catalog shows that Kold-Hold Serpentine Plate Type Evaporators have no equal in efficiency and dependability for locker plant space cooling, for shelves and stands in sharp-freezing or as cabinet liners, shelves or dividers. It explains how "Hold-Over" Plate Type Evaporators maintain the temperature of delivery bodies at the uniform level necessary in the successful transportation of fresh meat, ice cream, frozen foods and other perishables.

If you are interested in better storage and transportation of your products, write for this new free book of refrigeration knowledge today.

KOLD-HOLD

KOLD-HOLD MANUFACTURING COMPANY
502 N. GRAND AVENUE LANSING 4, MICHIGAN

tions for the new officers were received from the nominating committee, and following the usual procedure, those elected were: Elton Lewis, *President;* R. G. Walbridge, *Vice-president;* W. H. Hendrickson, *Secretary;* C. M. Flohr, *Treasurer;* and A. L. Mahon, *Sergeant-at-Arms.* George Monjian of Liquid Carbonic Corp. was the guest of the evening and invited the members to attend a meeting February 18 at which Lincoln, Nebr., and Sioux City members would be present. At this meeting, Liquid Carbonic products would be explained with the aid of a display including films, slides and a glass evaporator.

READING CHAPTER

Reading, Pa., Feb. 5—During a brief business session a letter was read from the national secretary granting a transfer to Howard K. Wengert, of Cleona, Pa., and to David A. Krumbein, of Lebanon, Pa., from members at large to members of the Reading Chapter. Two new applications for membership were received and turned over to the investigating committee. The meeting was turned over to the educational committee who introduced Joe Stirle. Mr. Stirle showed movies entitled "Music in the Air" presented by The Westinghouse Mfg. Co., and "Trip Through Burma." Refreshments were served later.

NOVA SCOTIA CHAPTER

Halifax, N. S., Jan. 17—The annual meeting of the Nova Scotia Chapter was held at the Lord Nelson Hotel. Officers elected were: Leonard Foster, *President;* Andy W. Myers, *First Vice-president;* William T. Moores, *Second Vice-president;* Chas. J. Tredwell, *Secretary-Treasurer;* and Fraser M. Herman, *Sergeant-at-Arms.* On the educational program, pictures were shown and supplied by Gilbert Wilson of the General Electric Co. A nice lunch was served at the close of the meeting.

DAYTON CHAPTER

Dayton, O., Dec. 13—A meeting was held at Allied Parts but due to the bad weather there was a small attendance. The annual election of officers took place with the following results: G. H. Brock, *President;* Tom Callison, *First Vice-president;* Lee Sunderhaus, *Second Vice-president;* Delbert R. Goll, *Secretary;* Chas. L. Ott, *Treasurer;* and Geo. A. Snyder, *Sergeant-at-Arms.* Board of Directors is comprised of W. R. Sherer, M. B. Kenyon and A. A. Peffley. Russell E. Wagner was elected *Chairman, Educational Committee.* Following the election there was a discussion of several problems and refreshments wound up the evening.

Dec. 15—A few of the members and their wives went to the Manor on the Wittenberg College Campus in Springfield to attend a Christmas party. An enjoyable four-course dinner was served and presents were exchanged. The Secretary was presented with a $20 bill in appreciation of his services and the balance of the evening was spent in playing cards and dancing.

Jan. 10—Meeting was held at the offices of W. H. Kiefaber Co. A large attendance of members and visitors were present. Several committees were appointed by the president and a motion to hold the February 14 meeting at Lima, Ohio, was passed. It was hoped that in holding the meeting at Lima it would help organize a chapter in that locality. Mr. Wagner conducted a short educational session and refreshments were served at the close of the meeting.

Jan. 24—An unexpected visit from Mr. Smoot of Frigidaire provided an interesting talk for the evening. Mr. Smoot gave some worthwhile information on commercial refrigeration and frozen foods.

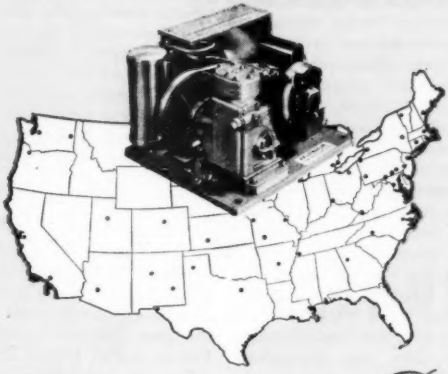
CHARLESTON CHAPTER

Charleston, W. Va., Feb. 12—The third meeting of the newly formed Charleston Chapter was called to order by President Harry G. Frame at the Kanawha Hotel. Those present were: R. H. Amick, B. T. Baird, J. W. Booher, P. W. Chambers, H. G. Frame, V. K. Gaskins, G. E. Hopkins, W. P. Miller, S. W. Priestley, K. P. Rupe, J. W. Stickels, L. E. Von Woglom, J. I. Watt and C. A. Wiley. Announcement was made by Mr. Frame of the chapter arrangements with the international office to secure the entire program of films on refrigeration service.

TRENTON CHAPTER

Trenton, N. J., Jan. 23—The annual election of officers occupied the main part of the business session and those elected were: George Frie, *President;* J. Herbert Jaeger, *Vice-president;* Harry Jaeger, *Secretary;* Robert Loucks, *Treasurer.* Board of Directors—Merle Eldredge, Wm. Funkhouser and Ervin Schultz. Burton Golden and Maxwell Koplin were elected to membership and Mr. Frie appointed a committee to study the new plumbing code and report on it at the next chapter meeting. Anouncement was made of the next Board of Directors meeting.

KELVINATOR CONDENSING UNITS AND REFRIGERATION SUPPLIES



NOW *Competitively Priced* AND *Conveniently Warehoused*

Refrigeration service organization and independent service men know from past experience that they can depend on Kelvinator Parts Depots for fast service on their requirements of parts, supplies and complete condensing units. Now Kelvinator's warehousing system and distribution facilities . . . established at 50 strategic distributor and branch points throughout the country . . . make Kelvinator parts and supplies and complete Kelvinator Condensing Units more widely available than ever before.

NASH-KELVINATOR CORPORATION, Detroit.

BUY KELVINATOR FOR YOUR COMMERCIAL REFRIGERATION REQUIREMENTS

Kelvinator

CONDENSING UNITS OPEN AND SEALED

BEHIVE CHAPTER

Salt Lake City, Utah, Jan. 31—The meeting was held in the General Electric Supply Corp. and got under way with a buffet lunch which enjoyed the largest turnout of any meeting in the chapter history. After presenting the charter to Beehive Chapter, J. L. Driskoll, member of the International Board of Directors, from Burley, Idaho, administered the oath of membership and presented certificates of membership. Temporary President, A. Ernest Greetham presided over the election of permanent officers. An immediate declaration of appreciation for the splendid job of organizing done by the temporary officers resulted in their positions being declared permanent by acclamation, therefore, the officers still stand as follows: A. Ernest Greetham, Salt Lake City, *President;* Theo. Beck, Ogden, *Vice-president;* Don Baird, Brigham City, *Second Vice-president;* Sam Richard, Brigham City, *Secretary;* Art Grange, Salt Lake City, *Treasurer.* Geo. W. Olsen of Flint Distributing Company, Salt Lake City, was appointed *Corresponding Secretary.*

ATLANTA CHAPTER

Atlanta, Ga., Jan.—A very successful meeting was held by the Atlanta Chapter with 121 in attendance. Mr. Praetz of Liquid Carbonic Corp. was the speaker of the evening and with the aid of movies, slides and demonstration equipment, provided a full evenings' information on the servicing of Liquid Carbonic's fountain equipment. Refreshments were served following the meeting, through the combined efforts of Graves Refrigeration Supply and Bowen Refrigeration Supply Company and Leo Bosarge Company.

SAN DIEGO CHAPTER

San Diego, Calif., Jan. 17—The meeting was held in the banquet room of the "House of Rosso" at Pacific Beach, a suburb of San Diego. After a grand steak dinner, the meeting was called to order by Retiring President French. After a short talk on "Obligations and Policies" of the Society, Mr. French introduced the incoming officers. After the ceremony of installation, President Wampler took over the meeting. Standing committees for the year were appointed and H. E. Friedrichs was made chairman of membership, C. E. Anderson, Education and Entertaining, and G. F. Coombs, Auditing.

According to custom of the chapter, all members' names were put in a ballot box and the committees to provide education and entertainment for each monthly meeting were chosen by lot at a meeting of the Board of Directors. Twelve committees were formed in this way and all members have the opportunity to participate in the programs. The standing Educational Committee acts in an advisory capacity. An open discussion was held on the subject of examination for certificate membership and it was ordered carried forward to the next regular meeting. Wm. Stelzer, a charter member and first Treasurer of the chapter, was accepted for re-instatement. After the meeting, many of the members journeyed to the chapter club room and spent the balance of the evening playing our official game of two-card Poo.

MILWAUKEE CHAPTER

Milwaukee, Wis., Feb. 5—Meeting was held at the Pfister Hotel in Milwaukee. Mr. Wierman introduced George Monjian of Liquid Carbonic Corp. of Chicago, to the 225 refrigeration men and their wives. Mr. Monjian, with the capable assistance of Mr. Pence, also of Liquid Carbonic, presented a series of interesting slides and cut-away models. Following this, President Wierman introduced the many dairy distributors, out-of-town members and visitors. Lunch and coffee was then served. The ladies did not attend as well as expected. Only 38 of the 225 were present. Many of the out-of-town members braved the dangerous foggy weather, driving from such places as Racine, Kenosha, Oconomowoc, Grafton, Newburg, Waukesha and Waukegan, Illinois.

MIAMI CHAPTER

Miami, Fla., Jan. 9—The greater part of the evening was devoted to business matters of the chapter and following several committee reports, the matter of meeting programs came up for discussion and it was finally decided that the pattern of each meeting would include educational and entertainment programs from 8 PM to 9:30 PM each meeting, with business occupying the balance of the evening. An effort was made at this time to decide upon a permanent meeting place, with Redman's Hall being suggested. Thirty-five were in attendance at the meeting.

Jan. 23—Several entertaining movies were shown at the beginning of the evening, which were followed by a talk by Edwin Hadden, an electrical engineer and professor at the North Side Technical High School. Mr. Hadden's subject was electrical theory and its connection with an atomic theory.

NU-COIL
REFRIGERATOR
COIL
CLEANER

NO OBJECTIONABLE ODOR
UTMOST IN LABOR SAVING
CAN BE USED OVER REPEATEDLY
OFTEN IMITATED
IS PRACTICAL—QUICK ACTING
LET YOUR WHOLESALER
EXPLAIN . . . . *NOW*

SKASOL CORPORATION
112 Glencoe Ave. Webster Groves, 19 Mo.

CENTRAL CONNECTICUT CHAPTER

Hartford, Conn., Jan.—The annual election of officers was held at this meeting with the following results: Frank H. Tarala, *President;* John Paar, *First Vice-president;* William Heald, *Second Vice-president;* Theodore J. Sobola, *Recording Secretary;* Francis Dungan, *Corresponding Secretary;* Charles Bidwell, *Treasurer;* and Harold Gorman, *Sergeant-at-Arms.* Board of Directors—John Barrett, William Day and John E. Paull. Announcement was made that the installation of officers would take place at the Fifth Annual Banquet, to be held in February.

COLONELS CHAPTER

Louisville, Ky., Jan.—The annual meeting was held at Ed. Marcum's, where the election of officers occupied the large part of the evening. Those elected were: H. C. Moore, *President;* Y. D. McKinley, *Vice-president;* E. J. Dicken, *Secretary-Treasurer;* E. K. Tingle, *Sergeant-at-Arms.*

PROVIDENCE CHAPTER

Providence, R. I., Feb. 6—An open house meeting was held for members and friends. Guests from neighboring chapters in Massachusetts and Connecticut were present to hear Israel Kramer of Kramer Trenton Co. explain and demonstrate the new Thermobank unit. The talk was very educational and was enjoyed by all. Refreshments and door prizes followed the talk and the meeting adjourned at 12 PM.

MONUMENTAL CHAPTER

Baltimore, Md., Jan. 9—The meeting was called to order by Mr. Patten, the President. Mr. Patten introduced Arthur Hohmeyer from Ranco controls, who gave a very interesting and educational talk on controls—their construction and application.

TOLEDO CHAPTER

Toledo, O., Feb. 13—Announcement was made at this meeting of the visual training program provided by the National Society and of the starting date for the Toledo chapter to be the May meeting. Announcement was also made of the Liquid Carbonic meeting which would be held in March. Following the business meeting, a representation of Detroit Lubricator provided an educational program aided by moving pictures. Door prize was won by S. Sabin.

MOUNT ROYAL CHAPTER

Montreal, Canada, Feb. 13—The hightlight of the evening was a talk by Arthur Doane of Railway and Engineering Specialties, Toronto Branch, who spoke on frozen foods. Mr. Doane brought with him a film on frozen foods, through the courtesy of Bird's Eye Frozen Food Corp. A reminder was made to the members about the dinner-dance to be held in February.

SOUTHERN OHIO CHAPTER

Portsmouth, O., Dec. 12—Officers elected at this annual meeting were: Carl Bussel, *President;* Earl Minch, *Vice-president;* Raymond Steiner, *Secretary;* Carl Ackley, *Treasurer;* Preston Steiner, *Sergeant-At-Arms;* and A. Thomas, *Chairman of Board.* Board of Directors—Forrest D. Poole, George P. Kaut, Francis Overman, Howard Journey, Ralph Layton and Gene Ratcliff.

Jan. 8—The major part of the evening was devoted to a discussion on the results of the examination for certificate membership held in December. The questions asked and remembered by those who took the examination provided the basis of discussion.

Feb. 12—This was a dinner meeting held at the Chez Paree supper club, eight miles south of Portsmouth. An enjoyable steak dinner preceded the meeting. A brief business meeting followed the dinner and an announcement was made of the forthcoming visual educational program arranged for by the International Society.

TRI-COUNTY CHAPTER

Joliet, Ill., Feb. 16—Following a rather lengthy business meeting, a thirty minute sound film on the subject of safety as well as efficiency, produced by the Pacific Gas and Electric Company, was shown. The film and projector were secured through the American Red Cross. On the educational program, Harold Anderson acted as moderator in a round table discussion on multiplex systems. Examples and methods of multiplexing, including the use of the capillary tube, were drawn on the board and thoroughly discussed.

WICHITA CHAPTER

Wichita, Kan., Feb. 21—Members of the Wichita Chapter entertained their wives and guests at a box supper and bingo party at the Steffen's hostess room. Following the supper, the evening was spent playing cards

"FARTHEST NORTH" in Modern Refrigeration

Write for catalogs, engineering assistance, or a representative to call.

DOLE REFRIGERATING CO., 5910 N. PULASKI RD., CHICAGO 30, ILL.

N. Y. BRANCH; 103 PARK AVE., NEW YORK 17, N. Y.

Another SUPERIOR FIRST

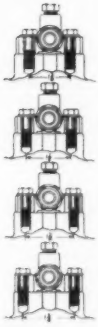
The **"UNI-HOLE" Flanged Compressor Valve**

. Has Universal bolt holes for use with 5/16" bolts or cap screws, to facilitate installation on compressor flanges having 1-3/8", 1-1/2", 1-5/8", or 1-3/4" centers.

Simply install the "Uni-Hole" Valve in its proper position . add the two heavy washers (supplied with each valve) between the flange and bolt, or cap screw head . . then tighten. That's all there is to it!

Ask your Jobber to show you the SUPERIOR "Uni-Hole" Flanged Compressor Valve. You're sure to like it! It's a natural . . . and besides saving you installation time, it reduces your stocking problem. *One size does* the work of four!

The diagrams at the right tell the story.



RD 132 A

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • STOCKS CHICAGO (6) • LOS ANGELES (15) • JOBBERS EVERYWHERE

and a short entertaining program. The committee in charge of arrangements included: Mesdames Howard Haselwood and C. F. Moore; Messrs. J. E. Christian and Harleigh Knox. Officers of the chapter who were elected to serve the 1946 session are: F. M. Barrell, *President;* C. E. Hall, *Vice-President;* Jack D. Edwards, *Secretary-Treasurer;* and J. E. Christian, *Sergeant-At-Arms.*

WYOMING VALLEY CHAPTER

Wilkes-Barre, Pa., Feb. 11—The major part of the evening was devoted to business matters of the chapter. Then, after adjournment, Allen Reese presented a colorful sound film on research and growth of vegetables used in the making of Campbell's soups. This film was followed by another short film entitled "A Child's Christmas Eve Dream."

FOX RIVER VALLEY CHAPTER

Fond du Lac, Wis., Feb. 12—During the business session it was decided that the chapter would apply to the National Association for the series of films on refrigeration servicing. It was suggested that rather than obtain a new charter, Acting International President be asked to secure the original charter or duplicate thereof, which would be presented to the chapter. Announcement was made of the forthcoming meeting, at which time Ansul Chemical Company would be invited to provide the educational program.

S S S

CLIMATIC HANGAR NEARS COMPLETION

THE huge aircraft testing facility, being constructed for the Army Air Forces Proving Ground Command at Elgin Field, Florida, will be completed early this summer. The installation will provide means for proof testing complete aircraft including engines and other Army Air Forces equipment through a temperature range of —70° F. to +165° F., and under all climatic conditions. Civilian Civil Service employees will operate the project. Applications are now being taken for Refrigeration Operating Engineers, Steam Operating Engineers, Firemen, Mechanics, Electricians, Instrument Mechanics, Electrical Engineers and Research Engineers. Appointments will be made for employment to commence in April or May. Those interested in these positions should contact the Chief, Climatic Section, Elgin Field, Florida.

News From—

The Dispatcher

WILLIS STAFFORD is the proud father of a new baby girl, born February 21. Mother and Daughter are doing well and Daddy has time off from the Navy to be with them at their home in Warrenville, Ill. Incidentally, Willis reports next to the Naval Station at Great Lakes with the expectation of getting his discharge.

Joseph S. Moore has sold the General Refrigeration Service of Akron to Elmer Dearing who will continue the business under same name.

Mr. Moore will now operate the Akron Refrigeration Supplies, Inc., at 219 W. Bartges Street. Associated with Mr. Moore is Mr. Earl Dubin and Lt. Col. Edgar A. Gray who has recently returned from the European theatre of war.

Richard Henry Bush was elected November 23, 1945, to the position of Youngest Son of the John K. Bush family of Lockporte, N. Y. John is a member of the R.S.E.S. International Board of Directors and of the Buffalo, N. Y. Chapter.

A new Corporation, Krebs-Calkins, Inc., has been formed in Elyria, Ohio, to engage in the sale and installation of Refrigeration and Air Conditioning. Incorporators are E. D. Krebs, Max Calkins, Kathleen Vaughn and Frank A. Stetson who is also attorney for the firm.

Mr. and Mrs. Glen W. Dresback of Bloomington, Ill., and Mr. and Mrs. James J. Kline of Springfield, Ill., are visiting with the Persette's in Miami, Florida. All are members of R.S.E.S. in their respective home towns.

Air Control, Inc., of Omaha, has been incorporated in Nebraska to deal in refrigerated air conditioning appliances. The firm had been dissolved in 1943, and under the re-incorporation, it has authorized capital stock of $100,000 and right to commence business with $1,000 paid up. Incorporators are Harry R. and Milton S. Frankie, and Phineas and Louis S. Wintroub, all of Omaha.

For Efficient Refrigeration Use Proved and Improved Controls

K-15

K-20

V-200

S-5-2

S-5-3

Here is efficient, unsurpassed refrigeration equipment. Specifically designed for the control of Freon, Sulphur-dioxide, Methyl-chloride and Ammonia. Also air, water, gas, light oil, etc. Suction lines or hi-pressure liquid lines.

K-15 and K-20 Series. Magnetic liquid and suction stops. The direct acting single seated needle valves and the piloted piston valves respectively. All valves are held open electrically, thus eliminating unnecessary compressor burdens. Tight shut-off for fractional tonnage installations. Features are Die-forged bodies, Hardened steel needles, Corrosion-proof internal parts, Gasketless construction, Integral mounting features, Moisture-proof high pressures. Single or dual voltage coils.

V-200 Thermal Expansion valve. Interchangeable Orifice Cartridges permit proper sizing on the job, making this literally six valves in one. Unmatched sensitivity, semi-liquid charged; may be placed in ambient temperatures higher or lower than bulb temperatures with no loss of control. Frictionless pusher-pin, ample diaphragm, plus balanced, low-rate adjusting spring. Carefully lapped hard-faced ball insures tight shut-off.

Strainers S-5 Series. The importance of suitable strainers ahead of a flow control device, such as automatic or regulating valves of any kind for long operating life, cannot be too heavily stressed. Bronze, iron or semi-steel bodies, Monel, reinforced bronze or felt screens, 3/16 to 120 strainer meshes.

For complete *specifications on these and other refrigerant controls in the broad General Controls line, write for the new 1946 Catalog 52C. Send request to your nearest Factory Branch, Distributor or Refrigeration Supply House.*

GENERAL CONTROLS

801 ALLEN AVENUE GLENDALE 1, CALIF.

FACTORY BRANCHES: PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

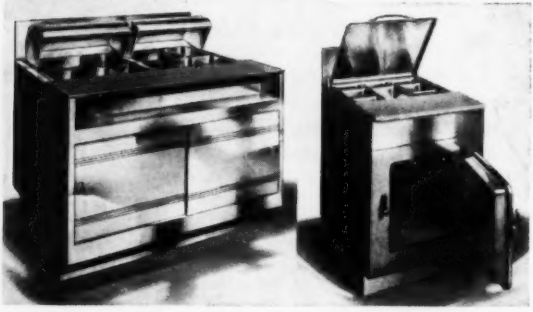
30-1

New and Improved Appliances

Addresses of Manufacturers represented in this department can be obtained from the Editor

New Fountain Equipment

STAINLESS steel water cooling coils, higher work surfaces and new Hold-Mor hot food units, are among the features of the 1946 soda fountain line announced recently by The Liquid Carbonic Corporation.



Liquid Carbonic Cold-sleeve fountain unit, featuring higher work surfaces, low temperature syrups, and 4-sided ice cream refrigeration. This 7-foot fountain has 40 gallon ice cream capacity.
Lower left: This new Hold-Mor hot food unit (steam table) is designed with rectangular stainless steel pans providing 50% greater capacity.
Lower right: The two-foot Cold Food Unit, a Liquid Carbonic product, has extra food capacity in a bank of food pans beneath the hard wood cutting board.

Design and engineering improvements in the Liquid line were dictated by interviews with more than 4,000 soda fountain operators, according to W. D. Jordan, vice-president of the fountain-cabinet division.

Liquid produces a full line of fountain-luncheonette equipment. These units also are available for wall type layouts, as well as narrow units for backbar installation.

Liquid fountain units, complete fountains and bobtails are equipped with reserve water chilling through stainless coils. These are designed to eliminate service problems hitherto resulting from block tin water cooling coils.

All units in the line have 33 inch high work surfaces—a height which extensive tests have shown is least fatiguing to the operator.

A new steam table, the Hold-Mor hot food unit, provides 50% greater capacity while occupying the same floor area as earlier models. The increased capacity is made possible by a new arrangement of close-fitting, rectangular stainless steel food pans. A new cold food unit (salad table) similarly is designed to provide 33 percent additional service capacity.

Low temperature syrup refrigeration also is a feature of the new Liquid line.

All fountain and luncheonette units are designed to fit together, assuring a continuous crevice-free surface the entire length of the fountain, thus facilitating cleaning.

Pipe Joint Compound In Stick Form

LAKE CHEMICAL CO., Chicago, Ill., announces Pipe-tite-Stik, pipe joint compound in a handy stick form. According to the manufacturer, all that is necessary is to rub 3 or 4 strokes of stick across pipe threads. It spreads and fills threads when turned. Encased in a convenient cardboard holder, the stick may be carried around in a pocket or tool kit.

It is claimed that it withstands "Freon," brine, gas, sulphur dioxide, acid, gasoline, oil, butane, propane, air, water, steam, etc. Joints can be disconnected easily after applying. Lubricates and completely seals pipe joint threads, nuts, bolts, gaskets, turnbuckles, etc. Cannot flow into and clog even the smallest size pipes. Withstands vibration, temperature changes, deflection, pressure. Joints can be remade without having to clean the threads. Prevents rusting. Contains no lead or injurious ingredients.

Grove Check Valve

FROM the standpoint of design, construction and operation, the Grove Chexflo Valve represents the utmost in simplicity and safety. Operation is effected by a synthetic rubber tube, stretched over a slotted, cup-shaped metal core, which expands to open and contracts to close. Due to the fact that this expansible tube closes instantly in balanced flow, prior to the

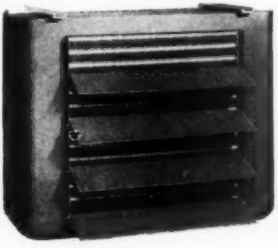
BLASTS OF COLD AIR!

THE RIGHT VOLUME OF COLD AIR FOR EACH PARTICULAR JOB

Rempe

OVERHEAD BLOWER UNITS
for low temperature cooling

- HOUSING . . . Bonderized steel
- TUBES AND BENDS . . . Full area—no obstructions
- COILS . . . Tinned copper or seamless steel tubing
- SIDES AND BOTTOMS . . . Well insulated
- LOUVERS . . . Individually adjustable
- FANS . . . Proper size for the right air velocity
- MOTORS . . . Enclosed silent type.



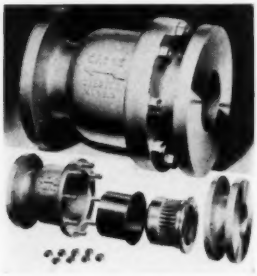
Every feature of Rempe Overhead Blower Units for Low Temperature Cooling has been designed to provide most efficient refrigerating conditions.

Every part of this unit has been analyzed and checked for maximum trouble-free service to meet present day operating standards.

Write today for the NEW COMPLETE ENGINEERING CATALOG from which you can easily select the right unit for every job.

REMPE COMPANY
358 No. Sacramento Blvd., Chicago 12, Ill.

commencement of back flow, there is never any tendency to establish pressure impulses, shock or water hammer through the flow line. The flexive tube possesses a uniform and constant spring



Exploded view of Grove Check Valve.

rate which avoids inertia being set up to cause operation beyond flow requirements. It likewise, improves in service due to the fact that "flexing" adds life to rubber. Because of its self-compensating and wear resistant factors this unit is particularly suited for handling even the most highly corrosive and erosive air, gases or liquids. Full details contained in Bulletin 610 are available on request to Grove Regulator Company, 6575 Green Street at 65th, Oakland 8, California.

New Unit Starter and Analyzer

EMMETT C. WILLIAMS, President of the Aircraft Service Company, Pittsburgh, Pennsylvania, announces a new companion refrigeration instrument to the current popular Thermostatic Control Tester which has been accorded such interesting acceptance in both the domestic and export markets. This addition to the Airserco line is the Airserco Unit Starter and Analyzer. This instrument for refrigeration service engineers will detect and identify every type of unit defect.

The patented and exclusive method used in this Analyzer is now made available to every service man. This instrument will start both hermetic and open type units up to ⅓ hp. under actual working conditions. Electric motors with defective condensers, centrifugal switches, relays, or wiring may be restored to operation. Two multiple gang switches, in combination with a universal relay, employing calibrated weights, set up fifty-six (56) individual starting combinations for correcting defects in hard-starting units. When a unit is restored to operation by the Analyzer, permanent repairs may be made by supplying a starting kit derived from the dial and weight readings. All components and circuits are utilized for other tests and checks. The instrument is simple to operate.

Its many starting combinations eliminate unwarranted tampering with sealed units. Aside from increasing the starting torque of refrigeration units and motors as much as 100%, the necessity of unit re-operation or repair is avoided by the use of the Airserco wiring harness or kits.

A new analyzer for sealed units.

The Airserco Analyzer comes completely self-contained in a sturdy steel gray crackle finished unit. The instrument weighs approximately eleven pounds. Incorporated in the instrument are various test circuits essential to installation, maintenance and repair work.

Coldaire Food Chest

PRESENTING the new Coldaire Food Chest, a simplified three cubic foot home freezer designed for the average urban family, which is being introduced simultaneously with the announcement of the formation of the Coldaire Corporation. The corporation has been formed to sell, merchandise and distribute frozen food cabinets and equipment which will be manufactured by Kellett Aircraft Corporation, Philadelphia, Pa. Announcement of both the new corporation and its first cabinet is made by

The Coldaire Home Freezer has a capacity of 120 pounds of food.

Charles W. Stillman, executive vice-president of Coldaire, which will have offices at 56 East Walton Place, Chicago 11.

The Food Chest, designed and engineered for best use in the kitchen, features a flush counter balance lid, table-top height and recessed base. With a capacity of 120 pounds of frozen foods, it will hold more than a week's supply for the average family of six.

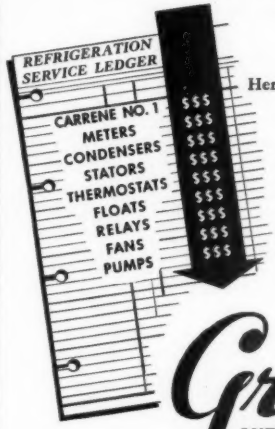
"The Coldaire Food Chest will fit into 90 per cent of America's kitchens," says Stillman, describing the cabinet as "the ideal frozen-food storage-freezer cabinet for the American family."

Extensive consumer research by the Bob White Organization, Chicago, determined the exterior design, capacity and functional, engineering of the cabinet. Extraneous "hardware" and useless extras have been omitted, acording to Stillman, to enhance the beauty and simplicity of the cabinet.

PROFITS FOR YOU

AN AUTHORIZED GRUNOW SERVICE

can add up to only one total on your 1946 Ledger: *Profits.*



Here are the facts—

- When a Grunow Refrigerator needs repair, the owner comes to you as a recognized authority. *You* get the business.
- Output of new refrigerators this year will not meet demand. Grunow Authorized Service will keep your personnel employed and help pay your overhead until the new boxes arrive.
- Servicing refrigerators already in use will acquaint you with owners and prospects for new boxes in your locality. They will respect your advice and buy from *you* when new refrigerators are ready for delivery.
- Check with us to see if a Grunow authorized service is open in your locality.

Grunow
AUTHORIZED SERVICE, INC.
4313 W. Fullerton Avenue, Chicago, Illinois

FACTORY TESTED PARTS

REPAIR AND SERVICE REFRIGERATORS—

— WIRING
— COPPER TUBING
— ELECTRODES, ETC.

with

IDEAL "THERMO-GRIP"
Electrically Operated
SOLDERING TOOLS

More and more refrigerator repair men are turning out top servicing jobs with these versatile soldering tools, that are more than just ordinary soldering irons — they are handy electrical soldering tools designed to handle hard and soft soldering— soldering terminals, lugs, delicate wiring, spot soldering, soldering copper tubing. Ideal for working in close quarters. IDEAL "Thermo-Grips" do a better job—quicker! The part touched heats almost instantly. Safe— no pre-heating or open flame hazard.

Wide variety of attachments to choose from, for every kind of soldering work.

Write for Detailed Literature

PROMPT DELIVERY

IDEAL INDUSTRIES, Inc.

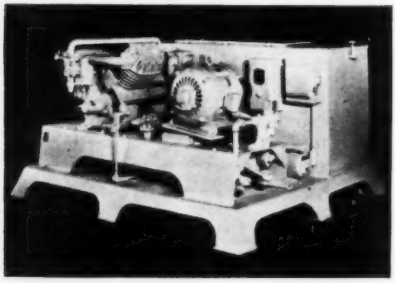
(Successor to Ideal Commutator Dresser Co.)

1093 Park Ave., Sycamore, Ill. Industrial Products Division

Instantaneous Water Coolers

DESIGNED primarily for beverage bottling plants, Potter & Rayfield, Inc., of Atlanta, Georgia, announce a line of new instantaneous water coolers that may be used wherever it is necessary to instantaneously cool water.

In the production of soda and other beverages, all of the bottlers depend upon the use of carbonated water to eliminate the flatness of the beverage. When forcing CO_2 into water to carbonate it, the amount of CO_2 that can be forced into the water depends upon the temperature of carbonization. The lower the temperature the more CO_2 can be held within the water. Therefore, successful carbonization depends upon



A new commercial water cooler.

the use of cold water, and all carbonated beverage installations must provide mechanical refrigeration means to obtain this cold water, unless they are fortunate enough to be in a locality where the available water temperature is in the neighborhood of 40°. There are very few such localities and refrigeration equipment is usually called for.

The process involves first the filtration of the water and then its cooling in some form of cooler, similar to the line announced by Potter & Rayfield, Inc. The water is then conducted to a carbonating machine where the gas is injected directly into the water and stirred up sufficiently to get intimate contact and absorption of the CO_2 into the water. The carbonated water is then led to the bottling machine when the specified amount of carbonated water is injected into the bottle just after the proper amount of syrup or other sweetening mixture has been placed in the bottle. The bottle is then capped and usually inverted for a short time in order to get proper mixing between the fruit and the water.

The P & R instantaneous water cooler consists of a single base on which is mounted the tank and Brunner compressor, making a compact unit. In this manner all connections are made between the water cooling tank and the condensing unit. The equipment is tested in the manufacturer's plant under actual working conditions for at least two days before shipment. This procedure assures the bottler that all adjustments have been properly made.

During experiments conducted when designing these coolers, P & R engineers calculated tables from which can be determined the capacity of each filler in the bottling plant for the various size bottles. As a result, the units are produced in the following capacities:

1. With Brunner 3 hp. compressor—75 gallons per hour.
2. With Brunner 5 hp. compressor—125 gallons per hour.
3. With Brunner 7½ hp. compressor—175 gallons per hour.
4. With Brunner 10 hp. compressor—250 gallons per hour.

Of course the above capacities will vary with the incoming water temperature which would reveal itself in the water going through the instantaneous tank and the water cooling the condenser.

These water cooling tanks are operated by thermostatic control and the bottler is assured of a uniform water temperature within two degrees—that is the temperature of the water from the outlet compartment of the cooling tank will not vary two degrees. With a low uniform water temperature the bottler is assured of proper carbonization. The capacities of the P & R instantaneous water cooling tanks are based on the capacities of the filling equipment which a bottler uses. The manufacturer claims the coolers will produce a uniform water temperature of 38° to 40° for the full capacity of the bottler's filling equipment. For example, if the filling equipment delivers 100 gallons of water per hour and the incoming water temperature is 90°, the instantaneous coolers with a 5 hp. fully automatic Brunner compressor will give the bottler 38° to 40° water for the full capacity of the filling machine.

Installation is simple requiring only that the water and electrical connections be made.

NOW . . .

PIPE JOINT COMPOUND

in Stick Form

FOR ALL THOSE PIPE INSTALLATION AND REPAIR JOBS—Always Ready for Instant Use

NO LEAKS
TIGHT JOINTS ASSURED
HANDY AS A PENCIL
Just rub 3 or 4 strokes across pipe threads. It spreads and fills threads when turned.

ECONOMICAL - HANDY - CLEAN

NO MESS - NO BRUSH
NO WASTE

Note these **FEATURES**

- Withstands Freon, methyl chloride, butane, propane and other refrigerants, oil, air, water, brine, etc.
- Lubricates and completely seals pipe joint threads, nuts, bolts, gaskets, turnbuckles, etc.
- Contains no lead. Contains no injurious ingredients.

TRADE MARK REG. PATENTED

ASK YOUR DEALER—OR WRITE US

COPR. 1946 *Lake Chemical Co.* 626 N. WESTERN AVE., CHICAGO 12, ILL.

PERFEX BUYS GOVERNMENT BUILDING

THE PERFEX CORPORATION, of Milwaukee, manufacturer of automatic temperature controls and industrial engine radiators, announced today the purchase of the manufacturing plant at 710 South Third Street, which it operated during the war as its Optical Division. The building, which contains 63,000 square feet of floor space, will be used to increase production. Including 66,000 square feet now under long term lease, the corporation has a total of 314,000 square feet . . . nearly five times the plant area which comprised Perfex when it started in 1934.

S S S

THE HARRY ALTER COMPANY ANNOUNCES NEW APPOINTMENTS

THE Harry Alter Company, Chicago and New York, wholesalers of refrigeration parts and Crosley distributors in the Chicago area, announces a number of new appointments. The two divisions of the company, namely, appliances and refrigeration parts, are now fully organized. The radio and major appliance division, covering metropolitan Chicago markets, is headed by Vice-President, Arthur S. Alter, formerly a Lieutenant Colonel in the Army, recently discharged. H. C. Huebner is General Sales Manager of this division, which distributes Crosley radios and refrigerators, and other Crosley appliances, Coleman space heaters, floor furnaces and water heaters, Voss washing machines, Regina floor polishers and Electrikbroom vacuum cleaners. Max Geisler has been appointed Sales Promotion Manager of this division. W. L. Wood continues in charge of service.

Irving Alter, Secretary and Treasurer, acts as General Manager of the refrigeration parts distributing division. Leo Alter, Vice-President, heads up Eastern operations for the company. Joseph R. Novotny, who prior to the war, was Purchasing Agent for the company, has been appointed Advertising Manager. He has just rejoined the company after spending three years in the Navy, winding up with the rank of Lieutenant (j.g.). The following are new appointments in this division: Ted Robateau, Purchasing Agent; Fillmore Weinstein, an Army veteran, Merchandise Manager; Alex Port, Export Manager; Harry Bernhart, City Sales Manager, supervising the activities of the following city salesmen and countermen: Joseph Kaplan, recently discharged from the Navy; Joe Holub, formerly a Captain in the Field Artillery; Steve Majeski; Leonard Sostrin, an Army dischargee; Harold McClure, also recently discharged from the Army; and Joe Koncak.

Haley Lang has been appointed General Operating Manager of the Chicago warehouse; and John McGovern, Manager of the Receiving Department; with J. H. Carava, Manager of the Parts and Supply Department.

Warren R. Kahn, newly discharged from the Army, has been appointed Manager of the Eastern Division. Martin W. Kent continues as Manager of the New York branch, which specializes in wholesale refrigeration parts and supplies. Recent additions to the sales staff of the New York branch are Murray Addinoff and Armond Nelson, both discharged veterans.

Harry Alter continues as President, and reports that prospects in both divisions of the company are exceedingly bright. Practically all employees who joined up with the services during the war have returned and have been re-employed, establishing a very gratifying record.

S S S

PHILIPP ELECTED NASH-KELVINATOR VICE-PRESIDENT

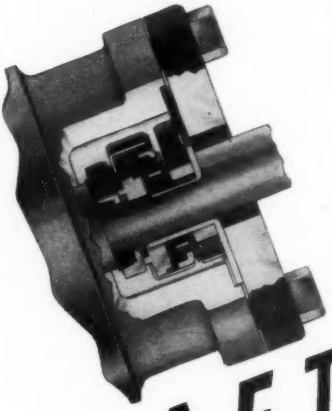
DR. L. A. PHILIPP, chief engineer, Kelvinator Division, Nash-Kelvinator Corporation, has been elected vice president of the corporation in charge of engineering, Kelvinator Division, George W. Mason, president, announced recently. The directors, at a regular quarterly meeting here, also reelected all officers.

DR. L. A. PHILIPP

Dr. Philipp joined Kelvinator in 1927 as director of research, after lengthy research fellowships at the University of California and the University of Michigan, where he received his Ph.D. degree in 1925. Dr. Philipp became manager of the Detroit plant of Nash-Kelvinator in 1937, and two years later became chief engineer of Kelvinator.

Recognized as one of the outstanding men in technical research, he has participated in many important refrigeration and appliance

Something New and BETTER IN



SHAFT SEALS

The ARLINGTON is simple in design. Easily installed — merely place shoulder seal against shaft shoulder — fasten main assembly to compressor in conventional manner. Installation labor costs cut to the bone — Simplicity and sturdiness assure long service — absolute customer satisfaction.

The BETTER ARLINGTON Shaft Seals available at your jobber.

Send for ARLINGTON literature.

Arlington SHAFT SEAL

MANUFACTURED BY
MODERN DESIGN PRODUCTS CO
CHICAGO 24, ILL.

Some Men Just Don't (Won't or Can't) See—

CERTAINLY there are plenty of men in refrigeration who don't, won't or can't see any need for supplementing what they already know with U.E.I.

BALANCED TRAINING

Funny part of it is that these fellows do seem to get by somehow. BUT consider service and installation men—yes, even men in the sales, administrative, and executive jobs in refrigeration—who have not been content to merely get by! They have fortified themselves with training—the kind of practical, sensible U.E.I. training which for the past 18 years has been helping men get farther faster in practically every branch of refrigeration. How would you bet on *them* in 1945? Do you think they'll make more money than the boys who "know it all"?

The main point is this: If you sincerely believe you can make more headway in your refrigeration job or business with the help of more knowledge—knowledge which you can get through home study plus actual shop work—and if you are not wearing a set of blinders which keep you from seeing the whole picture of the future in refrigeration, we invite YOU to write for free FACTS about U.E.I. training.

MAIL THIS COUPON TODAY

FREE FACTS

UTILITIES *Engineering Institute*
1314 W. Belden Ave.
Dept. 45, Chicago 14, Ill.

Please give me more information about Refrigeration and Air Conditioning Training, as promised in your "Refrigeration Service Engineer," March, 1946, advertisement.

Name .....

Address .....

City..... Zone..... State.....

1946—OUR TWENTIETH YEAR

developments and is believed to hold more refrigeration patents than any other individual. He was recently commended for his war services at Nash-Kelvinator by the Air Technical Service Command.

VIRGINIA HOLDS SALES CONFERENCE. ANNOUNCES NEW PRODUCTS

VIRGINIA Smelting Company's first post-war sales conference was held Jan. 21-26 at West Norfolk, home office of the company. Business and social sessions were conducted at the Nansemond Hotel, Ocean View, Va. District Representatives of the company, branch office key personnel and others spent three days reviewing the 1945 record and projecting plans for 1946 and after. One day was spent touring the West Norfolk Plant.

A highlight of the conference was announcement of Lethalaire, Virginia's aerosol insecticide for industrial and commercial users. Production of this new product was started last month; it is expected to become a major item in the Virginia line of refrigerants and chemicals.

Virginia Smelting Company was a processor of copper until 1926, when its plant was converted to the production of refrigerants and industrial chemicals.

Participating in the Norfolk program last month were: A. H. Eustis, Boston, President; C. W. Johnston, Portsmouth, Va., Vice-President; F. A. Eustis, Boston, Secretary-Treasurer; Robert LeBaron, Washington, D. C., Director of Research and Development; A. K. Scribner, Portsmouth, Va., General Manager; Rollin H. Israel, Manager of Refrigeration Sales and Director of Advertising; C. F. Bingham, Manager of Industrial Sales; L. J. Hitch, Manager of Export Sales; W. J. Taylor, Comptroller; H. B. Channon, Director of Technical Service; and others.

Virginia's District Representatives who attended the conference were: Charles Throm, Vice-President of Commercial Chemicals, Inc., Buffalo, N. Y.; Bob Kane, Manager, Innis-Speiden & Co., Cleveland, Ohio; Howard Wunker, Manager, Innis-Speiden & Co., Cincinnati, Ohio; E. V. Danbar, Atlanta, Ga.; Barney Arbuckle, Houston, Texas; Ace Barber, Delavan Engineering Co., Des Moines, Iowa; Robert Chambers, Denver, Colo.; Carl Miller, Seattle, Wash.; William Dever, Detroit, Mich.; Jack Eldridge and George Anderson, New York; Fred Binns and Robert Malcolm, Boston; Marshall Price, Chicago.

VIRGINIA SMELTING COMPANY HOLDS FIRST POSTWAR SALES CONFERENCE

Here are sales representatives and home office personnel of Virginia Smelting Company, snapped at Virginia's first postwar sales conference, Nansemond Hotel, Ocean View, Norfolk, Va., in January. Circled heads indicate: (1) F. A. Eustis, Secretary-Treasurer; (2) A. H. Eustis, President; (3) Charles W. Johnston, Vice-President; (4) Robert LeBaron, Director of Research and Development; (5) A. K. Scribner, General Manager. At Mr. LeBaron's right is Miss L. J. Hitch, Manager of Virginia's Export Department; the ladies on his left are home office secretaries, Mrs. Pontius and Miss Jackie Friedland.

MOTOR STARTING Capacitors

A REPLACEMENT TYPE FOR EVERY NEED

CORRECT TYPE BY CONSULTING CHART

UNIVERSAL AND EXACT-DUPLICATE TYPES

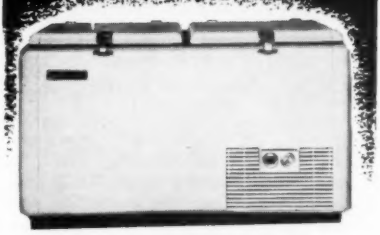
LOCAL JOBBER CARRIES CONVENIENT STOCK

AEROVOX capacitors

FOR RADIO-ELECTRONIC AND INDUSTRIAL APPLICATIONS

AEROVOX CORP., NEW BEDFORD, MASS., U.S.A.
Export: 13 E. 40th St., New York 16, N.Y. • Cable: 'ARLAB'
In Canada: AEROVOX CANADA LTD., Hamilton, Ont.

LOOMING BIG IN THE MODERN AMERICAN LIVING SCENE . . .



. . The BEN-HUR Farm & Home Freezer

Engineered and designed to bring the health-building benefits of fresh-frozen foods to the rank and file of better-living conscious Americans. Hundreds of thousands of new homes now planned and building are present prospects for a generous-size, dependable, quality-built BEN-HUR Farm and Home Freezer.

Service-wise dealers, anticipating increased customer good-will and confidence will feature and recommend the new "BEN-HUR" for these "Stand-Out" Quality Features.

★ ALL STEEL CONSTRUCTION
★ LIFETIME TESTED
★ ALL FOOD SURROUNDED BY COLD
★ A SIZE FOR EVERY FAMILY
★ THICK INSULATION (Hermetically Sealed)
★ MODERN, SMART DESIGN
★ ECONOMY-ENGINEERED

BEN-HUR MFG. CO.

Continuous Manufacturing Since 1911
634 E. Keefe Ave. Milwaukee 12, Wis.

BEN-HUR FARM & HOME FREEZERS

GENERAL CONTROLS APPOINTS NEW YORK MANAGER

THE appointment of Mr. Edgar P. Hollister as Manager of the New York Factory Branch was recently announced by Mr. J. F. Ray, Director of Sales, General Controls Company, Glendale, California.

Mr. Hollister will devote his entire time to serving users of automatic pressure, temperature and flow controls in New York State, New Jersey and Connecticut.

Mr. Hollister was formerly associated with the Bendix Aviation Corporation and brings to his new connection a wealth of engineering, sales and service experience.

* * *

LYNCH ANNOUNCES EXPANSION PROGRAM

M. H. PENDERGAST, President of Lynch Manufacturing Corp., Defiance, Ohio announced today an expansion program to increase the production of Par Commercial Refrigeration Units. Additional space is made available by the transfer of the Wrap-O-Matic Division from the Defiance plant to Lynch Package Machinery Corporation, Toledo, Ohio. New production facilities and machines are being added as well as a complete remodeling of the assembly lines.

The General Offices of the Corporation will be located at 3600 Summit Street, Toledo, Ohio in a new office building now nearing completion to house the offices of all of the Ohio subsidiaries of Lynch Corporation.

This expansion program will not only materially increase production of Par Commercial Refrigeration Units but will facilitate better service to Par customers.

Mr. R. L. Sears, Sales Manager of Par, extends a cordial invitation to all old and prospective customers to visit and inspect the new and expanded facilities.

* * *

INTERNATIONAL HARVESTER PURCHASES EVANSVILLE PLANT FOR REFRIGERATION

THE former Republic Aviation Corp. plant near Evansville, Ind., used during the war for the manufacture of airplanes for the navy, has been sold by the government to the International Harvester Company and will be used for the manufacture of the company's line of refrigeration products, it was announced here today by E. F. Schneider, general manager of Harvester's Refrigeration Division. The transaction is subject to the further approval of the Department of Justice and the War Department. Harvester expects to employ approximately 3,500 men and women when the plant is brought to full production.

Schneider said the company hopes to be able to rehabilitate the plant so that initial refrigeration production can be started some time in the late summer.

The entire managerial personnel of the Harvester Refrigeration Division will be moved to Evansville and will have its headquarters at the Evansville plant. This will mean that about 75 key executives and personnel of the division, headed by Schneider, will be moved from Chicago and other cities to Evansville. Key executives, technicians and engineers expect to go to Evansville within the next few weeks to begin the job of putting the plant in shape for production.

NEW HOME FREEZER—One of the first refrigeration products scheduled to be built by International Harvester at the recently purchased Evansville, Indiana, plant is the 10-cubic-foot home freezer. Plans call for the addition of other types of units as production gets under way in several months. E. F. Schneider, general manager of Harvester's Refrigeration Division, is shown explaining the new home freezer to two attractive visitors in Chicago.

Harvester will use its newly acquired plant for the production of its full line of refrigeration products, including a line of home freezers for the freezing and storage of food in the home; a line of two-temperature household refrigerators of conventional design; the company's existing line of milk

AIRO SERVICE
COVERS the NATION

ANNOUNCING OUR
1946

AIRO
Wholesale
CATALOG
of Refrigeration and Air Conditioning
PARTS — TOOLS — SUPPLIES
AND SHOP EQUIPMENT

Write today on your letterhead, please

AIRO SUPPLY CO.
WHOLESALE ONLY
2732 N. Ashland Ave., Dept. A
Chicago 14, Illinois

Service Engineers Report Outstanding Performance

SHANK

PRESSURE ACTUATED WATER REGULATOR

Used by Refrigeration Service Engineers for units requiring variable flow of water. Water supply is automatically regulated by condensing head pressure.

Best construction. Sylphon bellows with extra deep convolutions assure long life. Valve stem has full freedom of operation—maximum efficiency. Leak and corrosion proof. Renewable monel seat. Bronze water valve body.

Service Engineers prefer them because they cut service time and replacements.

Write for specifications and prices.

IMMEDIATE DELIVERY

CYRUS SHANK COMPANY
625 W. Jackson Blvd., CHICAGO 6, ILLINOIS

SERVICING THE
Meter-Miser
IS PROFITABLE BUSINESS WHEN YOU CAN HANDLE IT

Every well equipped service shop will find it can make extra profits by being able to service Meter-Misers. Plan on getting this business for your own shop this year. Meter-Miser users added to your list of customers will add profits and build good will in your community.

HERVEEN

the IDEAL REPLACEMENT GAS

Six years proven service

In April 1939 we formally announced this refrigerant. Since that time many thousands of Meter-Misers have been operating satisfactorily with HERVEEN. More and more service men are finding it meets their requirements and is making friends among Meter-Miser owners.

Order your supply to-day and be prepared. See your jobber or write direct to

Modern Gas Co., Inc.
Manufacturers & Refiners
1084 BEDFORD AVE.
Brooklyn 5, New York

coolers for use by farm milk producers, and a variety of motor truck refrigeration equipment. The company has engineered and designed a number of these lines of products during the war, and anticipates that this division of its business will be one of its fastest-growing postwar lines of products.

Schneider announced that Mark V. Keeler, former works manager of Harvester's wartime St. Paul gun plant, will be in charge of the actual operation of the Evansville plant, with the title of works manager. In addition to Schneider, other refrigeration division executives who will make their headquarters in Evansville are W. F. Borgerd, manager of engineering; C. A. Olson, divisional comptroller; C. D. Harris, manager of manufacturing, and Richard Siegel, industrial relations manager.

S S S

REFRIGERATOR LUBRICATION DISCUSSED IN TECHNICAL DATA FILE

A NEW technical data file prepared by the Department of Industrial Research, L. Sonneborn Sons, Inc., New York, gives practical information on the use of highly refined white mineral oils for the lubrication of domestic mechanical refrigerators. It tells how these oils increase the operating efficiency of the motor, fan and bearings as well as the compressor, thereby prolonging their life.

Of interest to refrigerator manufacturers, service and maintenance men, the file is standard file cabinet size and may be used as a folder for filing all essential data on the subject. Conveniently arranged on the front of the file are data on properties of the various white oils recommended for the purpose. Also listed are two charts giving the results of tests which indicate "100% greater service at optimum operating efficiency" for refrigerator systems employing these highly refined white mineral oils as lubricants.

An interesting insert titled "Lubrication Guide for Domestic Refrigerators," supplied with the file, lists various makes of refrigerators on the market and the grade of white mineral oil recommended in connection with the particular refrigerant employed.

A copy of the technical data file (F-20) may be obtained by writing to the White Oil and Petrolatum Division, L. Sonneborn Sons, Inc., 88 Lexington Avenue, New York 16, New York.

FRIGIDAIRE FORMS NEW SALES CORPORATION

E. R. GODFREY, General Manager, Frigidaire Division, General Motors Corporation, today announced the formation of a new corporation, Frigidaire Sales Corporation.

This new Corporation, a wholly owned subsidiary of General Motors Corporation, will have a capitalization of $5,000,000 and will operate Frigidaire Sales Branches. Officers of Frigidaire Sales Corporation will be announced later.

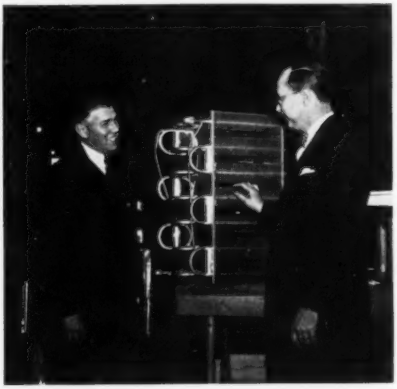
Mr. Godfrey stated that this new Corporation will better handle Frigidaire Post War sales activities and permit national pricing of many of the Frigidaire products to their customers.

S S S

PEERLESS MOVE COMPLETED

PEERLESS of America has completely moved all their facilities from Marion, Indiana, to five plants in the Northwest section of Chicago. This move was one of the biggest trucking jobs in the State of Indiana. 128 trucks moved machinery, material, etc., to the plants in Chicago, 150 miles away.

All of the supervisors and foremen of the Marion plant have come up to Chicago with Peerless and are organized to produce Peerless products on a production basis.



M. W. Knight, General Sales Manager, and W. A. Honeychurch, Assistant Sales Manager, inspect one of the Peerless Flash Tube Fin Coils for reach-in boxes, which has just come off the production line ready for shipment from the new plant in Chicago.

Previews of Our

1946 CATALOG

Will Be Released Sometime in March

Featuring a Complete Line of

Refrigeration Units,
Parts & Supplies
Electric Motors and Motor Parts
BRUNNER Condensing Units
KELVINATOR Condensing Units
HERMETIC Units and Parts
LYONS Metal Shop Equipment
SKILSAW Electric Hand Tools
B46-Bulletin Now Off the Press

Write For Your Copy Today
Wholesale Only

SERVICE PARTS COMPANY
2511 Lake St. **Melrose Park, Ill.**

BESTOLIFE
LEAD SEAL JOINT SEALING AND ANTI-SEIZE PIPE JOINT COMPOUND

'BESTOLIFE has been used successfully in the Refrigeration Industry for years.

'BESTOLIFE is non-corrosive and non-expanding. It takes the place of litharge and glycerine. Does not harden or dry out. Protects threads, keeps pipe joints tight yet easily broken apart.

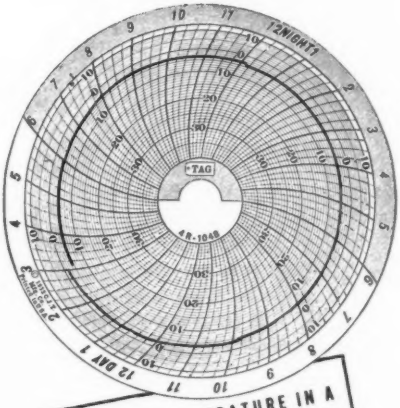
Prove 'BESTOLIFE'S efficiency for yourself. Trial 1¼ pound can sent anywhere in the U. S. for $1.00. This charge cancelled if not entirely satisfactory.

Manufactured Exclusively By

I. H. GRANCELL
1601 E. Nadeau St., Los Angeles 1, Calif.

THERMOBANK

by **KRAMER**



UNIFORM TEMPERATURE IN A SELF-DEFROSTING LOCKER ROOM

This is a 24 hour temperature record of a locker storage room of 500 locker capacity. Two compressors with two THERMOBANKS defrost independently at staggered time settings, giving minimum temperature fluctuations.

The contracting firm was the Refrigeration Corporation of America, 241 W. 64th Street, New York, N. Y.

WITH the THERMOBANK a zero degree system is just as automatic as a 40 degree system, in fact more so.

It never needs to be defrosted because it defrosts itself automatically without the use of brine sprays, water sprays or electric heaters.

Send for Bulletin T. V. 345 - RS

KRAMER TRENTON CO.

Trenton, New Jersey

The five Peerless plants are in full production and products are coming off the production lines in all these plants. The products Peerless is producing are fin coils, flash coolers, off-center coils, cube makers, capacity boosters, expansion valves and Thermek coils. Other products, such as unit coolers, cold plates, etc., are in the redesigning process and will be available in the near future, plus many other new items that Peerless is developing.

TROPIC-AIRE TO USE CARRIER EQUIPMENT

CARRIER CORPORATION, manufacturer of air conditioning and refrigeration, has entered into an agreement with Tropic-Aire, Incorporated, a subsidiary of The Greyhound Corporation, whereby Tropic-Aire is to have exclusive rights, with certain exceptions, to sell Carrier air conditioning equipment for motor busses in the United States, it was announced today.

Under the terms of the agreement, Tropic-Aire will handle Carrier air conditioning equipment exclusively in its domestic sales to bus manufacturing, owning and operating companies.

Total annual volume of business under the new arrangement was not predicted, but the announcement pointed out that "in the lively competition between bus, air and railway companies for postwar travel, major emphasis will be placed on comforts such as air conditioning."

The agreement, signed after comparative performance tests in which research engineers of both companies participated, unites two of the country's pioneers in bus air conditioning.

AIR CONDITIONING MADE EASY

SALESMEN "measuring" a store, restaurant, or office for self-contained air conditioners made by ACRMA members no longer need to make involved computations to arrive at the right answer. The Cooling Load Estimate Form, recently copyrighted by the Air Conditioning and Refrigerating Machinery Association, lists all the factors to be considered in adequately air conditioning a space. It provides simple computations to indicate the number and capacity of the self-contained air conditioners needed.

ACRMA's Cooling Load Estimate Form is designed mainly as an aid in the sale of "store coolers" through the 5-ton size, but may be used in figuring jobs requiring larger self-contained air conditioners. General use of the form will minimize the number of under-capacity air conditioning installations.

ACRMA's Room Air Conditioner Section will soon publish a form of selection procedure especially adapted for room air conditioners.

PENN DALLAS OFFICE HEADED BY PRICE

R. H. LUSCOMBE, sales manager, Penn Electric Switch Co., Goshen, Indiana has announced the appointment of E. A. Price as manager of the company's Dallas branch office at 302 Wilson Bldg.

E. A. PRICE

A graduate of the University of Minnesota with a degree in electrical engineering, Price was a sales engineer at Penn's home office from March, 1937, to September, 1941, when he was commissioned an Ensign in the U. S. Naval Reserve. Price served as an Engineer Officer on LST's and as Officer-in-Charge of a Landing Craft Repair Unit in the Pacific. He saw service in the Solomon Islands, Saipan and Okinawa campaigns. In November, 1945, Price was honorably discharged with the rank of Lieutenant Commander.

Penn manufactures a complete line of automatic controls for heating, refrigeration, pump and air compressor service as well as safety controls for internal combustion engines.

WARD REFRIGERATOR & MFG. CO. FORMED IN LOS ANGELES

DWIGHT A. WARD & ASSOCIATES have formed the Ward Refrigerator & Mfg. Co., capitalized for one million dollars with executive offices at 916 I. N. Van Nuys Bldg., Los Angeles 14, Calif.

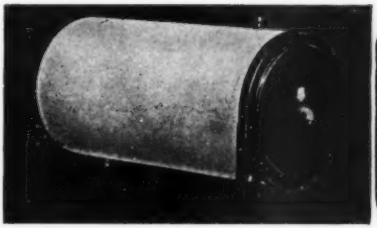
Mr. Ward has disposed of his interest in the partnership he formerly operated with his brothers under the same name. The new company will manufacture and distribute

NORMAL SUCTION PROCESS WATER COOLERS

6 to 25 gallon capacities.

Compact in design . . . can be mounted on floors, walls or ceilings.

Suitable for drinking water bubbler service, cafeteria or restaurant glass filler service.



DAY & NIGHT

COOLER DIVISION
DAY & NIGHT MFG. CO.
One of the Dresser Industries
MONROVIA, CALIFORNIA
FACTORY REPRESENTATIVES
NEW YORK — A. C. Homeyer, 682 Bdwy. • Marc Shantz, 565 Wash. Blvd.
CHICAGO
ST. LOUIS — B. H. Spangler, 3331 Market St. • J. E. Parker, 228 2nd St.
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Equipping a new Truck

Going back into Service Work ?

We have prepared a very helpful list of items suggested as a minimum stock. Several lists are available. Check the ones you want.

- ☐ Service Tools
- ☐ Parts for Domestic Service
- ☐ Parts for Commercial Service

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Milwaukee, 3, Wisc. 749 No. Seventh St.
Des Moines, 9, Iowa 106 Eleventh St.
Cedar Rapids, Iowa 503 Fourth Ave. S.E.
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Remember?

Those hot summer days when you were busier than a one arm paperhanger . . . when you were trying to be everywhere at one time . . . when you had trouble finding parts, etc.

Well, those days are just around the corner again. Save time, money and your disposition. Come to KRAMER when in need of Parts, Tools and Supplies.

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FRED C. KRAMER COMPANY
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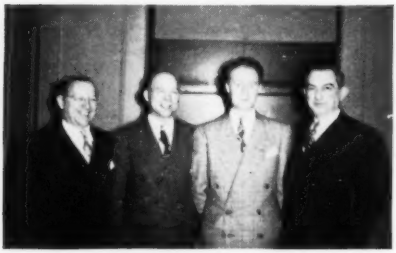
Telephone RANdolph 6288

from its new plant refrigeration units, both ice and electric, for domestic and commercial use, including deep freeze cabinets, beer cabinets, cold storage doors and kindred products.



Newly elected Officers of the Central Refrigeration Wholesalers Association. They are left to right: Irving Alter, Treasurer, Chicago; Gustave A. Larson, Vice Chairman, Madison, Wisc.; Jack Glass, Chairman, Chicago; L. C. Keely, Secretary, Chicago.

H. W. BLYTHE RETURNS

H. W. BLYTHE of the H. W. Blythe Co., who for the past 3½ years has been engaged in U. S. Government work, has now secured his release and will, in the future, devote his entire time to his refrigeration equipment wholesale business.

The H. W. Blythe Co. continued to serve its customers as usual during these past years in Mr. Blythe's absence. There is no anticipated change in their policy in the future.

HUMPHRIES OPENS SUPPLY HOUSE

BRUCE HUMPHRIES and his brother, Ivan, have opened a refrigeration supply house in Monroe, Louisiana. They will operate under the name "Humphries Refrigeration Supply Company" and will be located at 407 Walnut Street, Monroe, Louisiana. The company will deal in Wholesale refrigeration and Air Conditioning Supplies.

J. E. PARKER TO REPRESENT HIGHSIDE CHEMICALS

JOE E. PARKER of 294½ Peachtree Street, N.E., Atlanta 3, Ga., has been appointed sales representative of Highside Chemicals Company for the seven states comprising the southeastern district.

Mr. Parker will continue the company policy in his territory by calling on the refrigeration supply jobbers and manufacturers, and taking care of their requirements of Thawzone and Trace, Highside's two products for the refrigeration trade. Mr. Parker recently visited the home office of the concern in Newark, N. J.

MELCHIOR ARMSTRONG DESSAUR CO. PERSONNEL CHANGES

MELCHIOR ARMSTRONG DESSAUR CO. announce the opening of their sixth Branch Office at 234 West Washington Street, Syracuse, New York on March 4. Complete stocks of Refrigeration, Air Conditioning and Oil Heating Supplies and Equipment will be carried.

Matt Kratochwill has been appointed Manager of this Operation. Mr. Kratochwill, who has been associated with the company since his graduation from La Salle University in 1937 was recently released to inactive duty by the Army Air Forces. He had been in the Service since 1942 and held the rank of Captain.

George R. Simm is returning to the Syracuse Office as a Sales Engineer. Affiliated with the company since 1939, he served in the same capacity before the war. Mr. Simm attended engineering courses at Rutherford and Bennet Colleges, England.

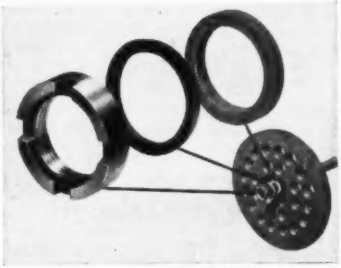
Plans have now been completed for the re-opening of Stocking Branches in Baltimore, Maryland and Washington, D. C. Complete details will be announced at a later date.

In connection with the expansion program, M. G. Johnson and J. C. Crocker have joined the home office organization in engineering capacities.

Mr. Johnson will serve as Design Engineer in the manufacturing program of Gravity Finned Coils. A graduate of Stevens Institute of Technology, he was associated with the company since 1938 until joining the Army Corps of Engineering in 1942. He advanced from the rank of Captain to that of Lieutenant Colonel.

J. C. Crocker will act in the capacity of Application Engineer. Also, just released from the Armed Services, he held the rank of Commander in the Navy and was Skipper of a Destroyer Escort in the North Atlantic. A graduate of Georgia Tech in 1937, he was associated with the Crane Company before the war.

ACME Ammonia Condensers



Lock-Nut Construction

—tubes easy to replace

Tubes can be quickly replaced right on the job with the tools you have with you. Simply take off the lock-nut, lead ring and rubber gasket (shown above) —slip out the old tube and put in a new one. Write for complete information.

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If You are located In Canada

• AIRCO gives the courteous fast service on your order that means so much when you need parts, supplies, or tools for the job.

Internationally known products for guaranteed performance build good will among your customers.

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Hidden leaks in refrigeration equipment cause serious damage to expensive installations and loss of costly products.

Years of use have proven ***VISOLEAK*** to be dependable, economical, safe and easy to use. See your refrigeration supply jobber, or write

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Domestic Cold Controls (Modern Type)	$2.00
Commercial Controls (Pres. or Temp.)	2.50
Commercial Dual Controls	3.00
Automatic Water Valves	2.00
Automatic Expansion Valves	1.75
Thermostatic Expansion Valves	3.00

All Prices F.O.B. Chicago and subject to change without notice.

ACME CONTROL SERVICE

3525 Lawrence Avenue—Chicago 30, Illinois

Phone PENsacola 3303

R. H. MONEY JOINS REYNOLDS METALS CO.

R. H. MONEY, refrigeration expert, has joined the Parts Division of the Reynolds Metals Company as an advisor, W. G. Reynolds, vice-president, announced today. He will be stationed in Louisville, Ky.

R. H. MONEY

Prior to joining Reynolds, Mr. Money was for fifteen years with the Crosley Corporation in Cincinnati, for ten years as chief Refrigeration Engineer and for the five years thereafter as Manager of Crosley's Electro Mechanical Engineering, a department which engineered and built pre-production models of many military developments including radar equipment. Since the war this department's name has been changed to Electro Appliance Engineering. Before becoming associated with Crosley, Mr. Money was ten years with the Rex Manufacturing Company, Connersville, Ind., first as service engineer and later as assistant chief engineer.

A native of Indiana, Mr. Money received some of his education at the University of Cincinnati. He is a vice-president of the American Society of Refrigerating Engineers, a member of the Engineering Society of Cincinnati, holder of approximately forty patents and patent applications, all in the household refrigerator field, and is a pioneer in the field of hermetic compressors and sheet metal evaporators for the household refrigerator.

S S S

IDEAL INCORPORATES

OWING to the steady, long term growth of our company to its present size, and to better provide for further expansion now under way, we, on February 1, 1946 changed to a corporation to be known as Ideal Industries, Inc.

As of that same date, the Ideal Commutator Dresser Company, a partnership, was terminated.

There has been no change in management, personnel, location, manufacturing, method of distribution of our products, nor any change in our high standard of quality and service. We will, therefore, welcome a continuance of our past cordial relations.

All new orders received after February 1, 1946 addressed to the Ideal Commutator Dresser Company, as well as all unfilled orders on hand as of that date will be turned over to the new corporation. All unpaid accounts due to the Ideal Commutator Dresser Company should be paid to Ideal Industries, Inc.

S S S

BRUNNER REORGANIZED

BRUNNER Manufacturing Company, Utica, N. Y., manufacturers of commercial refrigeration condensing units and air compressors, has recently been reorganized.

The capital stock, consisting of 100,000 shares of common and 18,000 shares of preferred, was purchased by a group of underwriters and the total issue has been fully subscribed and sold.

In the reorganization, Mr. George L. Brunner, former President and former principal owner of the stock, has become Chairman of the Board, and his son, George L. Brunner, Jr. has been elected President of the corporation.

Mr. A. G. Zumbrun, who has been with the company since 1925 and who has been its Treasurer for a number of years, has become Executive Vice-President and General Manager.

The business of the company has grown by leaps and bounds during the past several years and the present reorganization will provide additional capital to add to its facilities and enable it to expand to take care of the backlog of orders.

An additional building has been purchased and considerable additional machinery has been purchased and is now in process of being tooled up to meet the specific requirements of the company's manufacturing processes. A great deal of this machinery is designed for special purposes and when it is installed it will add greatly to the company's production facilities, and provide for closer control of manufacturing processes.

While all of these plans have been made and are in process of consummation, the management does not feel that their full effect will be reflected in 1946 production. Orders on hand are being filled as rapidly as possible but gray iron castings, motors, steel and electrical parts are still the bottleneck and the effects of the present strikes will be felt for some time to come.

PUT RUST TO WORK!

Brush or spray Nobs Glazecoat directly on rust. Rust aids in forming a permanent thermo-plastic coating that is not affected by water, alcohols, dilute acids, or alkalies. Prevents further rusting. Stands heat to 400° F. Covers about 300 sq. feet per gallon.

Price.....$3.50 per gal. F.O.B. Los Angeles

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Domestic Controls reconditioned equal to new at a small cost. All work guaranteed for one year. Prices upon request.

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Immediate delivery on a replacement schedule for over 125 compressors. Shipment of a replacement compressor can be made the same day yours is received. Most standard models available for this service.

90 day guarantee—Reasonable prices.

We do not repair hermetic units.

For quotations, 'phone BELmont 5635 or Write

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For Refrigeration Servicemen

Parts and tools you need now may be available from our ever increasing stock. We offer our assistance to you in getting what you need.

Our business is to serve you in your business

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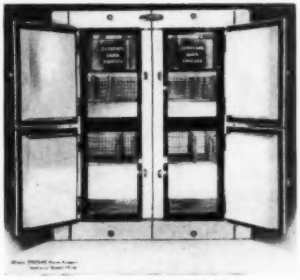
We completely disassemble controls, clean, test, check and replace defective or broken parts, adjust and set for proper temperatures.

Domestic Cold Controls (Modern)	$2.50
Commercial Controls (Pres. or Temp)	2.75
Automatic Expansion Valves	1.75
Thermostatic Expansion Valves	3.00
Automatic Water Valves	3.00

90 day guarantee ★ Prices F.O.B. Chicago

Refrigeration Control Service
4840 S. Springfield Ave., Chicago 32, Ill.



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SINCE 1939 Enthusiastic public acceptance and constant daily use have proved Wilson ZEROSAFE the greatest Reach-In Farm Freezer in America. These years of trouble-free ZEROSAFE service are your guarantee that the new ZEROSAFE, now greater than ever before, will continue to revolutionize American eating habits by making frozen fresh foods a part of daily living.

There is a ZEROSAFE size for EVERY need. Self-Contained Models are of 15 and 25 cu. ft. capacities; Sectional Models, from 22 cu. ft. to 120 cu. ft. Model illustrated is FF-44.

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DIVISION WILSON CABINET CO.
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ADJUSTABLE CAPILLARY TUBES
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YOU WON'T GET DINNERS AT THE RITZ LEAVING DOOR GASKETS ON THE FRITZ

5-A

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Cold Controls • Pressure Switches
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For Maximum Refrigerating Efficiency
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More Compression with the AUTO-DIESEL Helicam GAPLESS PISTON RING...

Holds high compression because of accurate finish, correct shape and Helicam GAPLESS feature. Two IDENTICAL interlocking parts form a ring WITHOUT A GAP, providing a tight seal that prevents blow bys. AUTO-DIESEL Helicam GAPLESS Piston Rings have the tension, flatness, circularity and close dimensional limits necessary for maximum performance. Made in sizes from 1" to 36" for original equipment and replacement in Diesel units of all types, and for pneumatic and hydraulic equipment. Can also be used as oil rings . . . as contracting rings for sealing shafts and bearings . . . or for replacing packings.

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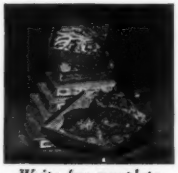

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for Conventional and Hermetic Type Compressors

Packed in Special Cardboard Boxes or Containers

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Write for illustrated catalog and price list.

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repaired or exchanged

at the following prices, F.O.B. Chicago

Automatic Expansion Valves (All Makes)	$1.75
Thermostatic Expansion Valves	3.00
Automatic Water Valves	3.00
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Commercial Controls (Temp. or Pressure)	2.75
Commercial Dual Controls	3.50

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IT'S
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JUSTRITE FLASHLIGHT
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SOLDERING COMPOUND
Cleans and tins in one operation

Penetrates rust, paint and grease—cleans and tins by simply applying heat.

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POSITION WANTED—Graduate of Commercial Trades Institute, 27, married, with excellent theory and some practical experience. Capable of servicing and installation of domestic and commercial refrigeration. Conscientious, quick learner. Have own car. Available any time. Will accept position anywhere in the States. Write John Kish, 4822 Carey St., East Chicago, Indiana.

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IN this department you will find many ideas designed to help you in your daily refrigeration service work. The Service Pointers published in this and past issues are field proven methods used by others. Make use of this valuable time-saving information.

Help us to maintain this mutual exchange of ideas!

If you have not already done so, we suggest that you read the Service Pointers in this issue. Then sit down and let us have your own ideas. Address "Service Pointers"

The REFRIGERATION SERVICE ENGINEER
433 N. Waller Ave. Chicago 44, Ill.

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through the years

DAVISON'S *refrigeration grade* SILICA GEL

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- Prevention of channeling
- Removal of acids, corrosive compounds
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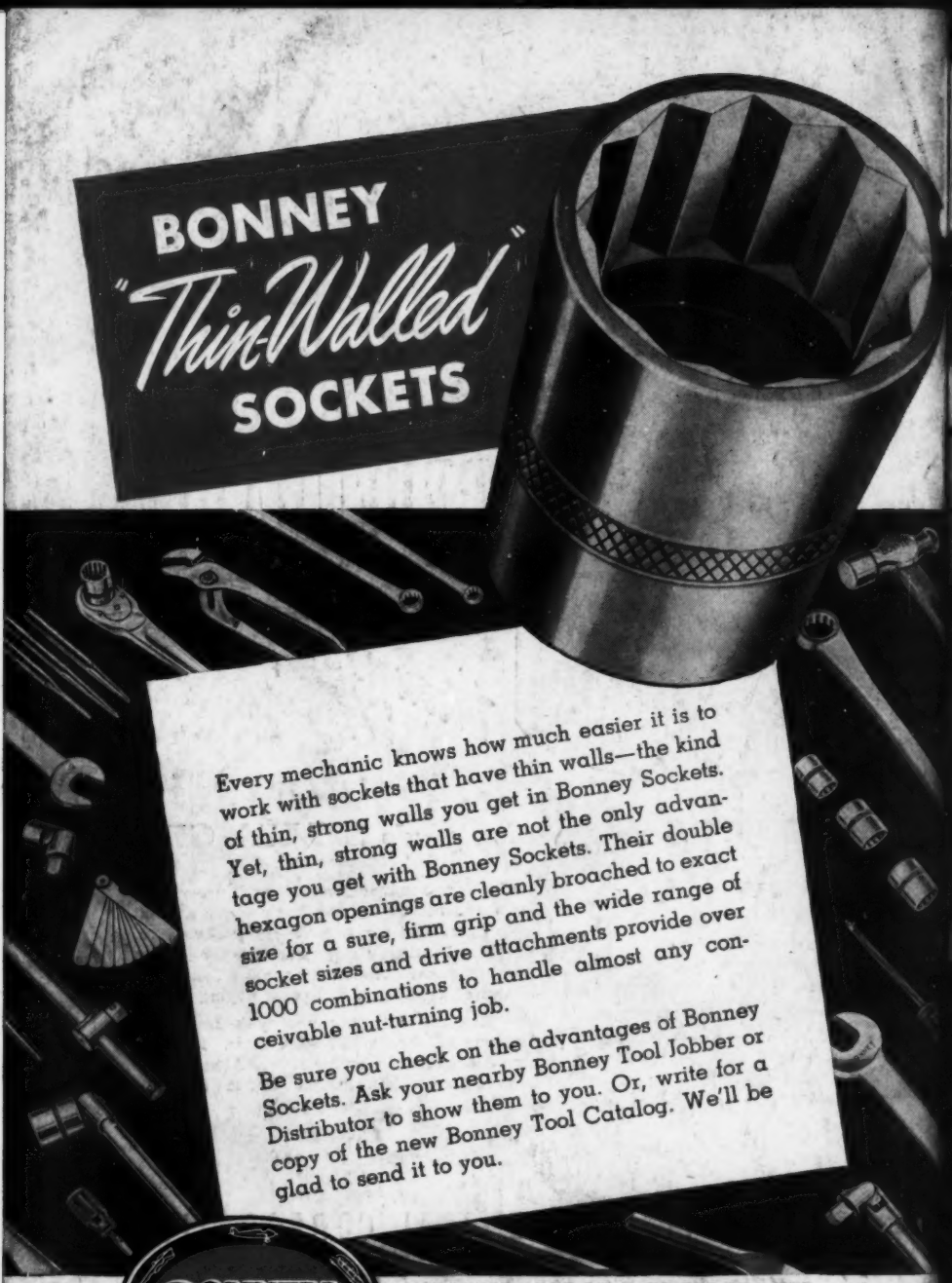

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